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STRUCTURE FILE UPDATES: 8 FEB 2006 HIGHEST RN 873837-20-8

DICTIONARY FILE UPDATES: 8 FEB 2006 HIGHEST RN 873837-20-8

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<http://www.cas.org/ONLINE/UG/regprops.html>

=> file hcapl

FILE 'HCAPLUS' ENTERED AT 11:14:10 ON 10 FEB 2006

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FILE COVERS 1907 - 10 Feb 2006 VOL 144 ISS 8

FILE LAST UPDATED: 9 Feb 2006 (20060209/ED)

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This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d que

L2 3 SEA FILE=REGISTRY ABB=ON (7440-37-1/BI OR 9002-84-0/BI OR 9003-01-4/BI)
L5 808714 SEA FILE=HCAPLUS ABB=ON L2 OR SIO2 OR TIO2 OR ZRO2 OT SILICA OR TITANIA OR ZIRCONIA OR (ZIRCONIUM OR TITANIUM OR SILICON) (W) (OXIDE OR DIOXIDE)
L8 1361 SEA FILE=HCAPLUS ABB=ON (L5 OR INORG? OR GLASS? OR CERAMIC?) (3 A) SUBSTRATE? (6A) (POROS? OR POROUS OR PORE#)
L9 9 SEA FILE=HCAPLUS ABB=ON (HEAT? OR THERM?) (2A) RESIST? (4A) (?POLYMER? OR RESIN#) (3A) SUBSTRATE? (6A) (POROS? OR POROUS OR PORE#)
L10 54257 SEA FILE=REGISTRY ABB=ON PI/PCT
L11 76 SEA FILE=HCAPLUS ABB=ON (L8 OR L9) AND (GRAFT? (3A) ?POLYMER? OR PTFE OR POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID? OR L10)
L12 14 SEA FILE=HCAPLUS ABB=ON L11 AND ELECTROLYT?
L13 32 SEA FILE=HCAPLUS ABB=ON L11 AND MEMBRAN?
L14 6 SEA FILE=HCAPLUS ABB=ON L11 AND SWELL?
L15 4 SEA FILE=HCAPLUS ABB=ON L11 AND PROTON? (3A) CONDUCT?
L16 15 SEA FILE=HCAPLUS ABB=ON L12 OR L14 OR L15
L18 9 SEA FILE=HCAPLUS ABB=ON L13 AND ELECTROCHEM?/SC,SX
L19 15 SEA FILE=HCAPLUS ABB=ON L16 OR L18
L20 20 SEA FILE=HCAPLUS ABB=ON L13 NOT L19
L22 1 SEA FILE=HCAPLUS ABB=ON L20 AND (FUEL (2A) CELL# OR BATTER?)
L23 16 SEA FILE=HCAPLUS ABB=ON L19 OR L22

=> d 123 1-16 bib abs ind hitstr

L23 ANSWER 1 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:632470 HCAPLUS
DN 143:156307
TI Fuel cell electrode, its use in **membrane-electrode assembly**, and fuel cell
IN Kondo, Yumi; Tanaka, Aoi; Mino, Norio
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 23 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005197178	A2	20050721	JP 2004-4536	20040109
PRAI	JP 2004-4536		20040109		

AB The electrode has an **electrolyte**, a **porous electrode substrate** (e.g., **glass**, **ceramic**, fiber, resin), and a catalyst (e.g., Pt, Ru, Pd, Ni, Rh, Co, Ir, Os, Fe) loaded on an elec. conductor (e.g., C, metal, conductive polymer), wherein the catalyst loaded on the conductor is supported on the inner walls of the substrate pores, and the **electrolyte** is contained in the pores so that the catalyst is in contact with the **electrolyte**. Alternatively, the electrode has an **electrolyte**, a porous conductive electrode substrate (e.g., C, metal), and a catalyst, wherein the catalyst is supported on the inner walls of the substrate pores, and the **electrolyte** is contained in the pores so that the catalyst is in contact with the **electrolyte**. Alternatively, the electrode has an **electrolyte** and a porous conductive electrode

substrate, wherein the substrate has catalyst function and further contains a catalyst, and the **electrolyte** is contained in the substrate pores so that the inner walls of the substrate and/or the catalyst are in contact with the **electrolyte**. Alternatively, the electrode has an **electrolyte**, a porous electrode substrate, and a conductive catalyst, wherein the catalyst is supported on the inner walls of the substrate pores, and the **electrolyte** is contained in the pores so that the catalyst is in contact with the **electrolyte**. In the **membrane-electrode** assembly using a polymer **electrolyte membrane**, the above electrode is stacked as an anode and/or a cathode. A fuel cell using the electrode or the assembly is also claimed. The electrode decreases inner resistivity to suppress voltage drop.

- IC ICM H01M004-86
ICS H01M004-90; H01M008-02; H01M008-10
- CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
- ST fuel cell **membrane** electrode assembly; catalyst **electrolyte** porous electrode fuel cell
- IT Glass fibers, uses
RL: DEV (Device component use); USES (Uses)
(GF/D, electrode substrate; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT **Polyimides**, uses
RL: DEV (Device component use); USES (Uses)
(cellular, electrode substrate; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT Filter paper
(electrode substrate; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT Sulfonic acids, uses
RL: DEV (Device component use); USES (Uses)
(perfluorosulfonic acid polymers, Flemion, **electrolyte**; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT **Polyimides**, preparation
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(polyether-, porous carbon for electrode substrate from; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT Polyethers, preparation
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(**polyimide**-, porous carbon for electrode substrate from; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT Fuel cells
(polymer **electrolyte**; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT Fuel cell electrodes
Fuel cell **electrolytes**
(porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)
- IT Polyoxyalkylenes, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)

- (porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT Ionic conductors
(**protonic, electrolyte**; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(sulfo-containing, perfluoro, Flemion, **electrolyte**; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 860293-89-6, BP 011
RL: DEV (Device component use); USES (Uses)
(cellular, electrode substrate; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 7440-44-0P, Carbon, uses
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(cellular, electrode substrate; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 1344-28-1, Alumina, uses
RL: DEV (Device component use); USES (Uses)
(**ceramic, electrode substrate; porous** electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 50851-57-5, Poly(styrenesulfonic acid) 145817-03-4 264624-35-3, Trifluorostyrenesulfonic acid homopolymer
RL: DEV (Device component use); USES (Uses)
(**electrolyte**; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 25036-53-7P, 4,4'-Diaminodiphenyl ether-pyromellitic anhydride copolymer, **polyimide** SRU 25038-81-7P, 4,4'-Diaminodiphenyl ether-pyromellitic anhydride copolymer
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(porous carbon for electrode substrate from; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 25322-68-3, Polyethylene glycol
RL: RCT (Reactant); RACT (Reactant or reagent)
(porous carbon for electrode substrate from; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses 390761-63-4, TEC 10E50E 501004-25-7, TEC 61E54
RL: CAT (Catalyst use); USES (Uses)
(porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 7440-02-0, Nickel, uses
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(porous, electrode substrate, catalyst; porous electrode containing catalyst and **electrolyte** for **membrane-electrode assembly** in fuel cell)
- IT 25036-53-7P, 4,4'-Diaminodiphenyl ether-pyromellitic anhydride copolymer, **polyimide** SRU 25038-81-7P,

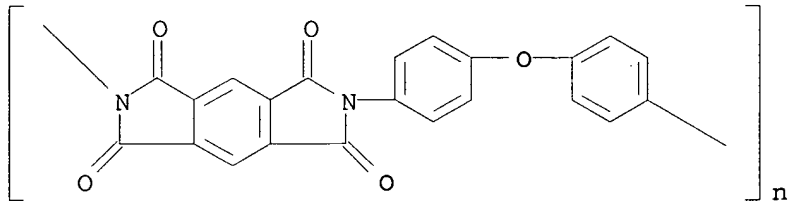
4,4'-Diaminodiphenyl ether-pyromellitic anhydride copolymer

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(porous carbon for electrode substrate from; porous electrode containing catalyst and **electrolyte** for **membrane-electrode** assembly in fuel cell)

RN 25036-53-7 HCAPLUS

CN Poly[(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c']dipyrrole-2,6(1H,3H)-diyl)-1,4-phenyleneoxy-1,4-phenylene] (9CI) (CA INDEX NAME)



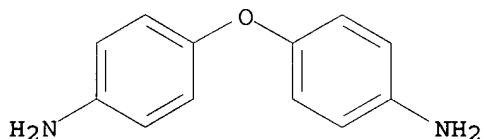
RN 25038-81-7 HCAPLUS

CN 1H,3H-Benzo[1,2-c:4,5-c']difuran-1,3,5,7-tetrone, polymer with 4,4'-oxybis[benzenamine] (9CI) (CA INDEX NAME)

CM 1

CRN 101-80-4

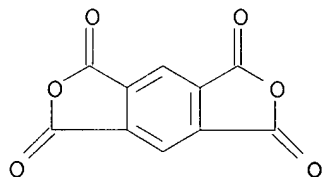
CMF C12 H12 N2 O



CM 2

CRN 89-32-7

CMF C10 H2 O6



L23 ANSWER 2 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:450524 HCAPLUS

DN 141:9617

TI Procedure for preparation and use of dimensionally stable **proton-conductive membrane** on a flexible ceramic(s) **membrane** filled with polymer **electrolyte**

IN Hennige, Volker; Hying, Christian; Hoerpel, Gerhard

PA Creavis Gesellschaft Fuer Technologie Und Innovation MbH, Germany
 SO Ger. Offen., 20 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 10254732	A1	20040603	DE 2002-10254732	20021123
PRAI	DE 2002-10254732		20021123		

AB A **proton-conductive**, flexible and dimensionally stable **electrolyte membrane** impermeable for the reaction components of a fuel cell comprises as carrier a material-permeable, flexible, broken-through, glass- or polymer fibers-containing composite, which has a ceramic coating. This carrier is interspersed with **proton-conductive polymer electrolytes**. The **membrane** according to invention represents a new class of firm **proton-conductive membranes**. The base is a porous and flexible **substrate**, which contains glass or polymer fibers, preferably a glass fabric or a polymer fleece, and is provided with a ceramic coating. The pores of this composite are infiltrated with polymer **electrolytes**. Due to the ceramic nature of the composite, the polymer **electrolyte** expansion by water intake resulting in the shape changes of **membrane** are avoided. The **electrolyte membrane** is nevertheless extremely flexible, and can be used without problem as **membrane** in a fuel cell.

IC ICM H01M008-02
 CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 57

ST fuel cell **proton conductive membrane** ceramic polymer composite

IT **Membranes**, nonbiological
 (composite; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Acrylic fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (fabric; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Polyolefins
 RL: DEV (Device component use); USES (Uses)
 (fluorinated; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Polyoxyalkylenes, uses
 RL: DEV (Device component use); USES (Uses)
 (fluorine- and sulfo-containing, ionomers; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Polyolefins
 RL: DEV (Device component use); USES (Uses)
 (phosphonated; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Polyketones
 RL: DEV (Device component use); USES (Uses)

(polyether-; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Polyethers, uses
RL: DEV (Device component use); USES (Uses)
(polyketone-; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Ceramic coatings
Ceramic composites
Ceramics
(procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Fluoropolymers, uses
Glass fibers, uses
Polyamides, uses
Polybenzimidazoles
Polyethers, uses
Polyimides, uses
Polysulfones, uses
Synthetic polymeric fibers, uses
RL: DEV (Device component use); USES (Uses)
(procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Alcohols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Aldehydes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Esters, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)

- (procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)
- IT Ketones, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)
- IT Fuel cells
 (proton exchange **membrane**; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)
- IT Polyolefins
 RL: DEV (Device component use); USES (Uses)
 (sulfonated; procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)
- IT 78-10-4, Teos 919-30-2, Dynasylan AMEO 2031-67-6, Methyltriethoxysilane 2530-83-8 2530-85-0, Dynasylan MEMO
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)
- IT 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 9002-84-0, **Ptfe** 9003-53-6 9010-39-3, Polytriazole 13463-67-7, Titania, uses 24937-79-9, PvdF 25014-41-9, Polyacrylonitrile 31694-16-3, Peek 67183-98-6, Polyphenylsulfone 128611-68-7, Oxazole homopolymer
 RL: DEV (Device component use); USES (Uses)
 (procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)
- IT 7732-18-5, Water, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (procedure for preparation and use of dimensionally stable **proton-conductive membrane** on flexible ceramic **membrane** filled with polymer **electrolyte**)

L23 ANSWER 3 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:428852 HCAPLUS

DN 140:424680

TI Process for producing porous films useful for filtration applications and other uses

IN Tsuyumoto, Michio; Yamato, Yo

PA Daicel Chemical Industries, Ltd., Japan

SO PCT Int. Appl., 27 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004043666	A1	20040527	WO 2003-JP10426	20030819
	W: CN, KR, US				
	RW: DE, FR, GB				
	JP 2004175104	A2	20040624	JP 2003-283862	20030731
	EP 1561561	A1	20050810	EP 2003-811060	20030819
	R: DE, FR, GB				

PRAI JP 2002-328586 A 20021112
 WO 2003-JP10426 W 20030819

AB The process comprises steps of casting a polymer solution over a substrate so as to form a film and converting the film to a porous film according to the phase conversion technique, where the polymer and the substrate are selected so that the difference (Sa-Sb) between surface tension of polymer constituting the porous film, Sa [mN/m], and surface tension of the substrate, Sb [mN/m], is -10 or greater. In this process, there can be obtained a porous film exhibiting a high open pore ratio at the film surfaces and having uniform micropores from the surfaces through the internal part of the film. The obtained porous film is one having a multiplicity of mutually communicating micropores characterized in that the porous film has a thickness of 5 to 200 μm and with respect to both major surfaces of the porous film, exhibits a surface average pore diameter of 0.01-10 μm , a ratio (A/B) of surface average pore diameter (A) to internal part average pore diameter (B) of 0.3-3 and a ratio (C/D) of surface average open pore ratio (C) to internal part average open pore ratio (D) of 0.7-1.5.

IC ICM B29C041-12
 ICS B29C041-24; B29C041-38; C08J009-28

CC 38-3 (Plastics Fabrication and Uses)

ST phase conversion casting porous polymer film prodn process; surface tension cast film substrate phase conversion film porosity

IT Porous materials
 (films; process for producing porous films useful for filtration applications and other uses)

IT Polysulfones, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (polyether-, cast solution; process for producing porous films useful for filtration applications and other uses)

IT Polyethers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (polysulfone-, cast solution; process for producing porous films useful for filtration applications and other uses)

IT Films
 (porous; process for producing porous films useful for filtration applications and other uses)

IT Surface tension
 (process for producing porous films by casting and phase conversion with selective casting solution and substrate surface tension)

IT **Fuel cells**
Membrane filters
 (process for producing porous films useful for filtration applications and other uses)

IT Fluoropolymers, uses
 Polyesters, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (substrate; process for producing porous films useful for filtration applications and other uses)

IT 9003-39-8, Polyvinylpyrrolidone 25119-99-7, Vylomax HR 11NN
 25667-42-9, Sumikaexcel PES 5200P
 RL: TEM (Technical or engineered material use); USES (Uses)
 (cast solution; process for producing porous films useful for filtration applications and other uses)

IT 9002-84-0, Teflon 9003-07-0, Polypropylene
 25038-59-9, PET polyester, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (substrate; process for producing porous films useful for filtration applications and other uses)

IT 25119-99-7, Vylomax HR 11NN
 RL: TEM (Technical or engineered material use); USES (Uses)

(cast solution; process for producing porous films useful for filtration applications and other uses)

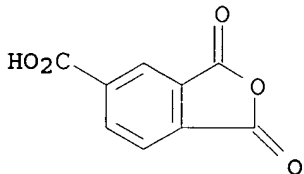
RN 25119-99-7 HCAPLUS

CN 5-Isobenzofurancarboxylic acid, 1,3-dihydro-1,3-dioxo-, polymer with 4,4'-methylenebis[benzenamine] (9CI) (CA INDEX NAME)

CM 1

CRN 552-30-7

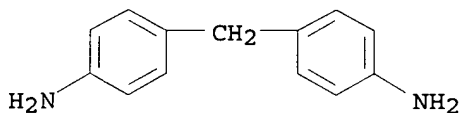
CMF C9 H4 O5



CM 2

CRN 101-77-9

CMF C13 H14 N2



IT 9002-84-0, Teflon

RL: TEM (Technical or engineered material use); USES (Uses)

(**substrate**; process for producing **porous** films useful for filtration applications and other uses)

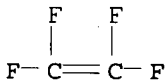
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 4 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:634141 HCAPLUS

DN 139:166972

TI Apparatus of high power density fuel cell layer with microstructured components

IN Mclean, Gerard Francis

PA Angstrom Power, Inc., Can.
 SO PCT Int. Appl., 59 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003067693	A2	20030814	WO 2003-IB915	20030205
	WO 2003067693	A3	20041216		
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
	US 6864010	B1	20050308	US 2003-349136	20030122
	US 6872287	B1	20050329	US 2003-349338	20030122
	US 6969563	B1	20051129	US 2003-349133	20030122
	US 6989215	B1	20060124	US 2003-348867	20030122
	CA 2473491	AA	20030814	CA 2003-2473491	20030205
	AU 2003207924	A1	20030902	AU 2003-207924	20030205
	EP 1506587	A2	20050216	EP 2003-704927	20030205
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK			
	JP 2005517273	T2	20050609	JP 2003-566927	20030205
PRAI	US 2002-354637P	P	20020206		
	US 2002-354743P	P	20020206		
	US 2002-354795P	P	20020206		
	US 2002-354912P	P	20020206		
	US 2002-360638P	P	20020301		
	WO 2003-IB915	W	20030205		
AB	The invention is a fuel cell made of a fuel plenum with fuel, an oxidant plenum with oxidant, a porous substrate communicating the fuel and oxidant plenum, a channel formed by the porous substrate, an anode, a cathode, electrolyte in a portion of the channel contacting the anode and the cathode preventing transfer of fuel to the cathode and preventing transfer of oxidant to the anode, a first coating to prevent fuel from entering a portion of the porous substrate, a second coating to prevent oxidant from entering a portion of the porous substrate, two sealant barriers, and a pos. and neg. elec. connection, wherein the invention also involves a multiple fuel cell layer structure, a bi-level fuel cell layer structure, and a method for making a fuel cell layer.				
IC	ICM H01M008-04				
	ICS H01M008-00; H01M008-24				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)				
	Section cross-reference(s): 38				
ST	fuel cell layer microstructured component				
IT	Optical memory devices				
	(DVD players, portable; apparatus of high power d. fuel cell layer with microstructured components)				
IT	Air				
	(O-enriched; apparatus of high power d. fuel cell layer with microstructured components)				
IT	Electrodeposition				
	Fuel cell electrolytes				

Fuel cells
Ink-jet printing
Radar
Screen printing
Sealing compositions
Soldering
Sputtering
 (apparatus of high power d. fuel cell layer with microstructured components)
IT Noble metals
 RL: CAT (Catalyst use); USES (Uses)
 (apparatus of high power d. fuel cell layer with microstructured components)
IT Aerogels
 (carbon, porous substrate; apparatus of high power d. fuel cell layer with microstructured components)
IT Telephones
 (cellular; apparatus of high power d. fuel cell layer with microstructured components)
IT Vapor deposition process
 (chemical; apparatus of high power d. fuel cell layer with microstructured components)
IT Polymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (co-, crystalline, porous substrate; apparatus of high power d. fuel cell layer with microstructured components)
IT Epoxy resins, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (coating; apparatus of high power d. fuel cell layer with microstructured components)
IT Glass, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (composites, **porous substrate**; apparatus of high power d. fuel cell layer with microstructured components)
IT Polymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (crystalline, porous substrate; apparatus of high power d. fuel cell layer with microstructured components)
IT Films
 (deposition; apparatus of high power d. fuel cell layer with microstructured components)
IT Etching
 (dry, laser-induced; apparatus of high power d. fuel cell layer with microstructured components)
IT Catalysts
 (electrocatalysts; apparatus of high power d. fuel cell layer with microstructured components)
IT Coating process
 (electroless; apparatus of high power d. fuel cell layer with microstructured components)
IT Carbon fibers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (fabrics, porous substrate; apparatus of high power d. fuel cell layer with microstructured components)
IT Metals, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (foam, porous substrate; apparatus of high power d. fuel cell layer with microstructured components)
IT Ablation
Cutting
Embossing
Etching

Extrusion, nonbiological
Lamination
Melting
Molding
 (fuel cell channel formed by; apparatus of high power d. fuel cell layer with microstructured components)

IT Computers
 (laptop; apparatus of high power d. fuel cell layer with microstructured components)

IT Transition metal alloys
 RL: CAT (Catalyst use); USES (Uses)
 (noble metal; apparatus of high power d. fuel cell layer with microstructured components)

IT Vapor deposition process
 (phys.; apparatus of high power d. fuel cell layer with microstructured components)

IT Coating materials
 (polymer; apparatus of high power d. fuel cell layer with microstructured components)

IT Ceramic composites
 Ceramics

Wood
 (porous substrate; apparatus of high power d. fuel cell layer with microstructured components)

IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous substrate; apparatus of high power d. fuel cell layer with microstructured components)

IT Electric apparatus
 (portable personal care; apparatus of high power d. fuel cell layer with microstructured components)

IT Optical ROM disks

Television
 (portable; apparatus of high power d. fuel cell layer with microstructured components)

IT Phenolic resins, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (reinforced, porous substrate; apparatus of high power d. fuel cell layer with microstructured components)

IT Coating process
 (spray; apparatus of high power d. fuel cell layer with microstructured components)

IT Etching
 (sputter, ion-beam, reactive, deep; apparatus of high power d. fuel cell layer with microstructured components)

IT Fluoropolymers, uses
 RL: DEV (Device component use); USES (Uses)
 (sulfonated; apparatus of high power d. fuel cell layer with microstructured components)

IT Platinum alloy, base
 Ruthenium alloy, base
 RL: CAT (Catalyst use); USES (Uses)
 (apparatus of high power d. fuel cell layer with microstructured components)

IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 12779-05-4
 RL: CAT (Catalyst use); USES (Uses)
 (apparatus of high power d. fuel cell layer with microstructured components)

IT 7782-44-7, Oxygen, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (apparatus of high power d. fuel cell layer with microstructured components)

IT 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-29-6,
Polybutylene
RL: TEM (Technical or engineered material use); USES (Uses)
(coating; apparatus of high power d. fuel cell layer with microstructured
components)

IT 7440-44-0, Carbon, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(foam, porous substrate; apparatus of high power d. fuel cell layer with
microstructured components)

IT 64-17-5, Ethanol, uses 64-18-6, Formic acid, uses 67-56-1, Methanol,
uses 1333-74-0, Hydrogen, uses 7664-41-7, Ammonia, uses 16940-66-2,
Sodium borohydride
RL: TEM (Technical or engineered material use); USES (Uses)
(fuel; apparatus of high power d. fuel cell layer with microstructured
components)

IT 7440-21-3, Silicon, uses 7782-42-5, Graphite, uses 9002-84-0,
Ptfe 9011-14-7, Polymethylmethacrylate
RL: TEM (Technical or engineered material use); USES (Uses)
(porous substrate; apparatus of high power d. fuel cell
layer with microstructured components)

IT 61722-01-8, Butylene-ethylene-propylene copolymer
RL: TEM (Technical or engineered material use); USES (Uses)
(sealant barrier; apparatus of high power d. fuel cell layer with
microstructured components)

IT 9002-84-0, Ptfe
RL: TEM (Technical or engineered material use); USES (Uses)
(porous substrate; apparatus of high power d. fuel cell
layer with microstructured components)

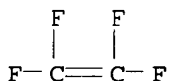
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L23 ANSWER 5 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:257990 HCAPLUS

DN 138:272662

TI Porous **membranes** with improved adhesion and mechanical strength
and manufacture of polymer gel **electrolytes**

IN Fujita, Shigeru; Kii, Keisuke; Uetani, Yoshihiro; Nakamura, Seiji;
Tabuchi, Masato

PA Nitto Denko Corp., Japan; Daiso Co., Ltd.

SO Jpn. Kokai Tokkyo Koho, 18 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	---	----	-----	-----
PI	JP 2003096232	A2	20030403	JP 2001-293283	20010926
PRAI	JP 2001-293283		20010926		

- AB The **membranes**, useful for battery **electrolytes**, showing 180° peeling strength ≥ 0.2 N/20-mm, comprise crosslinked polymers containing poly(meth)acrylates, polyoxyethylene, polyoxypropylene, polyoxyethylene-polyoxypropylene, polyphosphazenes, polyvinyl ethers, and/or polysiloxanes in the main chains and linear oligoalkylene oxides in the side chains supported on porous **membrane** substrates. Thus, 2:20:80 mol allyl glycidyl ether-diethylene glycol Me glycidyl ether-ethylene oxide copolymer was mixed with Blemmer PDE 100 (diethylene glycol dimethacrylate), applied on a ultrahigh-mol.-weight polyethylene porous **membrane** substrate, and heated to give a crosslinked **membrane** with 180° peeling strength 2 N/20-mm, which was immersed in a 1:2 vol ethylene carbonate and Et Me carbonate solution of lithium perchlorate to give a polymer gel **electrolyte** with ionic conductivity at 25° 6.0 ± 10^{-4} S/cm.
- IC ICM C08J009-36
ICS C09J129-10; C09J133-08; C09J133-10; C09J171-02; C09J183-04; C09J185-02; H01B001-06; H01G009-02; H01G009-035; H01G009-038; H01M010-40; C08L023-04
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
- ST battery **electrolyte** ion conductive porous polyoxyalkylene **membrane**; allyl glycidyl ethylene glycol methyl oxirane methacrylate; lithium perchlorate polyphosphazene polysiloxane **membrane** polyoxyalkylene acrylic
- IT Polyoxyalkylenes, uses
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic, crosslinked; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT Porous materials
(films; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT Battery **electrolytes**
Polymer **electrolytes**
(porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT Acrylic polymers, uses
Polyoxyalkylenes, uses
Polyphosphazenes
Polysiloxanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT Fluoropolymers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(porous substrate; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT Films
(porous; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT Polymerization catalysts
(ring-opening; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT 9002-88-4, Polyethylene
RL: TEM (Technical or engineered material use); USES (Uses)
(UHMWPE, porous **membrane** substrate; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)
- IT 115383-11-4P, Allyl glycidyl ether-diethylene glycol methyl glycidyl

ether-ethylene oxide copolymer
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
 (llyl glycidyl ether-diethylene glycol Me glycidyl ether-ethylene oxide copolymer; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)

IT 126-73-8, Tributyl phosphate, uses 1461-22-9, Tributyltin chloride
 RL: CAT (Catalyst use); USES (Uses)
 (porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)

IT 7439-93-2DP, Lithium, polyoxyalkylene complexes 454171-46-1DP, Allyl glycidyl ether-diethylene glycol glycidyl methyl ether-ethylene oxide-Blemmer PDE 100 copolymer, lithium complexes
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)

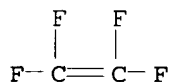
IT 9002-84-0, **PTFE**
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous **substrate**; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)

IT 9002-84-0, **PTFE**
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous **substrate**; porous **membranes** with improved adhesion and mech. strength for manufacture of polymer gel **electrolytes**)

RN 9002-84-0 HCAPLUS
 CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3
 CMF C2 F4



L23 ANSWER 6 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2003:251030 HCAPLUS
 DN 139:24074
 TI Development of pore-filling type polymer **electrolyte membrane** made by plasma **graft polymerization** with **PTFE** substrate
 AU Yamaguchi, Takeo; Kasahara, Seiji; Nakao, Shin-Ichi
 CS Department of Chemical System Engineering, The University of Tokyo, Tokyo, 113-8656, Japan
 SO Kagaku Kogaku Ronbunshu (2003), 29(2), 159-164
 CODEN: KKRBAW; ISSN: 0386-216X
 PB Kagaku Kogakkai
 DT Journal
 LA Japanese
 AB A pore-filling type **electrolyte membrane** was developed for use in direct methanol fuel cells. Pores of a porous substrate are filled with polyelectrolyte polymer. The filling polymer exhibits p conductance and the porous matrix inhibits polymer **swelling**,

which reduces MeOH crossover, and it also provides mech. strength at high temperature. The pore-filling **electrolyte membrane** was made by plasma **graft polymerization**. Poly(tetrafluoroethylene) (**PTFE**) was employed as the substrate and poly(acrylic acid) or poly(acrylic acid-co-allyl sulfonate) was used as the filling **grafted polymer**. Using a plasma power of 30 W, pores of the **PTFE** substrate were homogeneously filled with the **grafting polymer**. For the poly(acrylic acid-co-allyl sulfonate) **grafted polymer**, the **grafting** rate and allyl sulfonate content were enhanced by adding salt to the monomer solution. This may reduce the double charge layer thickness of the sulfonic group and enhance the reactivity of allyl sulfonate. The **membranes** contain 0.48 mmol sulfonic groups/g-membrane.

- CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
- ST Section cross-reference(s): 38
- ST polymer **electrolyte membrane** direct methanol fuel cell; **polytetrafluoroethylene** polyacrylic acid allylsulfonate **graft polymn**
- IT **Polymerization**
 (graft, plasma; pore-filling **polymer electrolyte membrane** made by plasma **graft polymerization** with poly(tetrafluoroethylene) substrate for direct methanol fuel cells)
- IT Fuel cell **electrolytes**
 Fuel cell separators
 Polyelectrolytes
 (pore-filling **polymer electrolyte membrane** made by plasma **graft polymerization** with poly(tetrafluoroethylene) substrate for direct methanol fuel cells)
- IT Fluoropolymers, uses
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (substrate; pore-filling **polymer electrolyte membrane** made by plasma **graft polymerization** with poly(tetrafluoroethylene) substrate for direct methanol fuel cells)
- IT 7647-14-5, Sodium chloride (NaCl), uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (plasma **graft polymerization** of poly(acrylic acid-co-allyl sulfonate) with poly(tetrafluoroethylene) substrate accelerated by sodium chloride for fabrication of **polymer electrolyte membranes** for direct methanol fuel cells)
- IT 9003-01-4, Poly(acrylic acid) 73144-86-2
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (pore-filling **polymer electrolyte membrane** made by plasma **graft polymerization** with poly(tetrafluoroethylene) substrate for direct methanol fuel cells)
- IT 9002-84-0, Poly(tetrafluoroethylene)
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (substrate; pore-filling **polymer electrolyte membrane** made by plasma **graft polymerization** with poly(tetrafluoroethylene) substrate for direct methanol fuel cells)
- IT 9002-84-0, Poly(tetrafluoroethylene)
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (substrate; pore-filling **polymer electrolyte membrane** made by plasma **graft**

polymerization with poly(tetrafluoroethylene) substrate for direct methanol fuel cells)

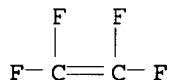
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L23 ANSWER 7 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:216130 HCAPLUS

DN 138:388079

TI Pore-filling type polymer **electrolyte membranes** for a direct methanol fuel cell

AU Yamaguchi, Takeo; Miyata, Fusae; Nakao, Shin-Ichi

CS Department of Chemical System Engineering, The University of Tokyo, Bunkyo-ku, Tokyo, 113-8656, Japan

SO Journal of Membrane Science (2003), 214(2), 283-292

CODEN: JMESDO; ISSN: 0376-7388

PB Elsevier Science B.V.

DT Journal

LA English

AB Pore-filling **electrolyte membranes** have been prepared for use as **electrolyte membranes** in a direct methanol fuel cell. The pores of a porous substrate were filled with a polymer **electrolyte**, with the **membrane swelling** being suppressed by the substrate matrix. **Proton conductivity** occurred through the filling **electrolyte** polymer. **Swelling** of the **electrolyte** polymer was used to control methanol permeation, and the substrate had good mech. strength at high temperature. We developed a **membrane** that consisted of a vinylsulfonic acid-acrylic acid crosslinked polymer gel in a porous **polytetrafluoroethylene** substrate. This polymer had a high **proton conductivity** with reduced **membrane** methanol permeability, and was thermally stable to 130°.

CC 52-2 (**Electrochemical**, **Radiational**, and **Thermal Energy Technology**)

ST polymer **electrolyte membrane** pore filling direct methanol fuel cell; acrylic acid vinylsulfonic acid polymer **electrolyte membrane** pore filling

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)

(**membrane** containing substrate of; pore-filling type polymer **electrolyte membranes** for direct methanol fuel cells)

IT Fuel cell **electrolytes**

(pore-filling type polymer **electrolyte membranes** for direct methanol fuel cells)

IT 25053-28-5, Acrylic acid-vinylsulfonic acid copolymer

RL: DEV (Device component use); USES (Uses)

(crosslinked; pore-filling type polymer **electrolyte membranes** for direct methanol fuel cells)

IT 9002-84-0, **PTFE**

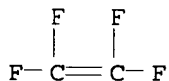
RL: DEV (Device component use); USES (Uses)
 (membrane containing substrate of; pore
 -filling type polymer electrolyte membranes for
 direct methanol fuel cells)

IT 9002-84-0, PTFE
 RL: DEV (Device component use); USES (Uses)
 (membrane containing substrate of; pore
 -filling type polymer electrolyte membranes for
 direct methanol fuel cells)

RN 9002-84-0 HCAPLUS
 CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3
 CMF C2 F4



RE.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 8 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2003:132524 HCAPLUS
 DN 138:171400
 TI Porous adhesive films and their application in manufacture of polymer gel
electrolytes
 IN Fujita, Shigeru; Kii, Keisuke; Uetani, Yoshihiro
 PA Nitto Denko Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 11 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003049133	A2	20030221	JP 2001-238990	20010807
PRAI	JP 2001-238990		20010807		

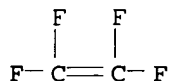
AB The porous adhesive films for batteries, capacitors, etc., have
 180°-peeling strength ≥ 2 N/20 mm and porous
membranes supporting crosslinked polymers obtained by polymerizing
 polyfunctional monomers and optionally monofunctional monomers in the
 presence or absence of polymers. Ion-conductive porous adhesive films
 having the above peeling strength and porous **membranes**
 supporting the above crosslinked polymers and **electrolyte** salts,
 are also claimed. The polymer gel **electrolytes** are manufactured by
 (1) forming the former porous adhesive films and **swelling** the
 crosslinked polymers with organic solvents containing **electrolyte**
 salts, (2) forming the ion-conductive porous adhesive films and
swelling the crosslinked polymers with organic solvents containing
 secondary **electrolyte** salts, or (3) forming the ion-conductive
 porous adhesive films and **swelling** the crosslinked polymers and
 dissolving the supported **electrolyte** salts with organic solvents.
 Thus, a porous UHMWPE **membrane** was dipped in a solution containing
 trimethylolpropane trimethacrylate, 2-methoxyethyl acrylate, and a
 catalyst, heated, and processed to give a crosslinked polymer-loaded

- porous adhesive film (180°-peeling strength 1.8 N/20 mm), which was immersed in a mixture containing ethylene carbonate, Et Me carbonate, and LiClO₄ to give a gel **electrolyte** showing conductivity at 25° 9.5 + 10⁻⁴ S/cm.
- IC ICM C09J007-02
ICS C09J133-00; C09J171-00; H01B001-06; H01B013-00; H01G009-02; H01G009-028; H01G009-035; H01M010-40
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52, 76
- ST porous adhesive film polymer gel **electrolyte**; ion conductive porous adhesive film gel **electrolyte**; UHMWPE porous adhesive film substrate; trimethylolpropane trimethacrylate methoxyethyl acrylate copolymer gel **electrolyte**; polymer gel **electrolyte**
battery capacitor
- IT Polyoxyalkylenes, uses
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic, lithium complexes, gel **electrolytes**; porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT Adhesive films
Gels
Polymer **electrolytes**
(porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT Fluoropolymers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(porous substrate; porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT 7791-03-9, Lithium perchlorate
RL: TEM (Technical or engineered material use); USES (Uses)
(acrylic polymer complexes, **electrolytes**; porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT 7439-93-2DP, Lithium, complexes with acrylic polymers 496942-22-4DP, lithium complexes 496942-23-5DP, lithium complexes
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(gel **electrolytes**; porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT 496942-22-4P, 2-Methoxyethyl acrylate-trimethylolpropane trimethacrylate copolymer 496942-23-5P, 2-(2-Ethoxyethoxy)ethyl acrylate-2-ethoxyethyl acrylate-methyl methacrylate-polyethylene glycol dimethacrylate copolymer
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT 9002-84-0, Polytetrafluoroethylene 9002-88-4, UHMWPE
RL: TEM (Technical or engineered material use); USES (Uses)
(porous substrate; porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- IT 9002-84-0, Polytetrafluoroethylene
RL: TEM (Technical or engineered material use); USES (Uses)
(porous substrate; porous adhesive films supporting crosslinked polymers for manufacture of polymer gel **electrolytes**)
- RN 9002-84-0 HCAPLUS
- CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L23 ANSWER 9 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2002:654437 HCAPLUS

DN 137:203948

TI Adhesive porous **membrane**, polymer ge **electrolyte** using the **membrane**, its manufacture, and its usage

IN Yamaguchi, Mutsuko; Uetani, Yoshihiro; Kii, Keisuke; Yamamura, Takashi

PA Nitto Denko Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 11 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002241533	A2	20020828	JP 2001-358854	20011126
PRAI	JP 2000-373465	A	20001207		

AB The **membrane** has a polymer selected from poly(meth)acrylate, polyoxyalkylene, polyphosphazane, poly vinyl ether, polyvinylidene fluoride, polyacrylonitrile, PVC, polyester, polyalkylene glycol di(meth)acrylate, and polysiloxane, with or without oligo alkylene oxide side chain, loaded on a porous support and having an adhesion force $\geq 2\text{N}$ on a 20 mm wide specimen peeled at 180° . The **membrane** may also contain an **electrolyte**. The polymer gel **electrolyte** contains an **electrolyte** in the adhesive **membrane** swollen by an organic solvent. The **electrolyte** is prepared by contacting the polymer loaded **membrane** with a solution of an **electrolyte** dissolved in an organic solvent, **swellable** for the polymer; and is useful for batteries and capacitors.

IC ICM C08J009-36

ICS C08K013-02; C08L101-00; H01B001-06; H01B013-00; H01G009-02; H01G009-035; H01G009-038; H01M010-40

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 76

ST battery gel polymer **electrolyte** adhesive **membrane**manuf; gel polymer **electrolyte** adhesive **membrane**structure manuf; capacitor gel polymer **electrolyte** adhesive **membrane** manuf

IT Capacitors

(double layer; polymer gel **electrolyte** containing adhesive **membrane** with porous substrates for double layer capacitors)IT Battery **electrolytes**(polymer gel **electrolyte** containing adhesive **membrane** with porous substrates for secondary lithium batteries)

IT Fluoropolymers, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(porous substrates for adhesive **membrane** in polymer gel electrolytes for batteries and capacitors)

IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate 7791-03-9, Lithium perchlorate 26570-48-9, Poly(ethylene glycol) diacrylate

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(polymer gel **electrolyte** containing adhesive **membrane** with porous substrates for batteries and capacitors)

IT 9002-84-0, Polytetrafluoroethylene 9002-88-4, Polyethylene

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(porous substrates for adhesive **membrane** in polymer gel electrolytes for batteries and capacitors)

IT 9002-84-0, Polytetrafluoroethylene

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(porous substrates for adhesive **membrane** in polymer gel electrolytes for batteries and capacitors)

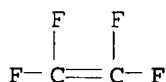
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L23 ANSWER 10 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2000:646292 HCAPLUS

DN 133:225582

TI **Electrolyte membranes** for fuel cells, their manufacture, fuel cells, and manufacture of the fuel cells

IN Yamaguchi, Takeo; Nakao, Shinichi

PA Center for Advanced Science and Technology Incubation, Ltd., Japan

SO PCT Int. Appl., 20 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000054351	A1	20000914	WO 2000-JP1370	20000307
	W:				
	AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW				
	RW:				
	GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 2000028310	A5	20000928	AU 2000-28310	20000307
	EP 1202365	A1	20020502	EP 2000-906746	20000307

applicant

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
IE, SI, LT, LV, FI, RO, MK, CY, AL

PRAI JP 1999-60817 A 19990308
WO 2000-JP1370 W 20000307

AB The **electrolyte membranes** have a **proton conductive** polymer filled in the pores of a porous substrate not **swellable** by MeOH or H₂O. The substrate is an inorg. material or a heat resistant polymer. The **membranes** are prepared by irradiating the porous substrate with an energy beam and contacting the substrate with a monomer to form the polymer. The fuel cells have the **electrolyte membrane** formed on the catalyst layers of their cathodes or anodes, and are prepared by applying sol on an electrode, converting the sol layer to a porous substrate film, filling the pores in the film with the **proton conductive** polymer, and laminating with the other electrode.

IC ICM H01M008-02

ICS H01M008-10

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

ST fuel cell **proton conductive** polymer **electrolyte**; polymer **electrolyte** porous substrate fuel cell

IT Plasma

(argon plasma in manufacture of **polymer electrolyte membranes** containing **heat resistant porous substrates** for fuel cells)

IT Fuel cell **electrolytes**

(manufacture of **polymer electrolyte membranes** containing **heat resistant porous substrates** for fuel cells)

IT Fluoropolymers, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(manufacture of **polymer electrolyte membranes** containing **heat resistant porous substrates** for fuel cells)

IT 9002-84-0, **Teflon** 9003-01-4, Polyacrylic acid

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(manufacture of **polymer electrolyte membranes** containing **heat resistant porous substrates** for fuel cells)

IT 7440-37-1, Argon, uses

RL: NUU (Other use, unclassified); USES (Uses)

(manufacture of **polymer electrolyte membranes** containing **heat resistant porous substrates** for fuel cells)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 11 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2000:554728 HCAPLUS

DN 133:267735

TI Preparation of Organic/Inorganic Composite Membranes by Plasma-
Graft Filling Polymerization Technique for
Organic-Liquid Separation

AU Kai, Teruhiko; Yamaguchi, Takeo; Nakao, Shin-ichi

CS Department of Chemical System Engineering, University of Tokyo, Tokyo,
113-8656, Japan

SO Industrial & Engineering Chemistry Research (2000), 39(9), 3284-3290

Handwritten note: No Send Sept 2000

2.

CODEN: IECRED; ISSN: 0888-5885

PB American Chemical Society

DT Journal

LA English

AB Pore-filling-type organic/inorg. composite membranes were prepared by a plasma-graft polymerization technique. Shirasu porous glass (SPG) was used as the inorg. substrate, and Me acrylate was used as the grafting monomer. Two preparation procedures were employed: direct plasma grafting and two-step plasma grafting. Optical microscope and micro-FT-IR studies showed that the grafted polymer was formed in the pores of the SPG substrate. The thickness of the grafted layer formed by direct plasma grafting was about 50 μm . With the two-step plasma grafting, the grafted layer formed was thinner. The grafted membranes showed chloroform selectivity in pervaporation and vapor permeation of a chloroform/n-hexane mixture. The separation performance of the grafted membranes was stable throughout the separation expts. This implies that the grafted polymers are covalently bonded to the inorg. substrate. The grafted membrane prepared by the two-step plasma grafting showed higher selectivity than that of a filling-type membrane with a high-d. polyethylene (HDPE) substrate. This result proved that the inorg. substrate can exhibit a high swelling-suppression effect and the filling-type membrane with an inorg. substrate can exhibit high selectivity in pervaporation separation. The membranes were thermally stable at least up to 150 $^{\circ}\text{C}$.

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 35, 37

ST org inorg composite membrane plasma graft polymn; liq
org sepn composite membrane

IT Shirasu

RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(acrylate-grafted; preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique for organic-liquid separation)

IT Membranes, nonbiological

(composite; preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique for organic-liquid separation)

IT Polymerization

(graft, plasma; preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique for organic-liquid separation)

IT Glass, uses

RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(porous, acrylate-grafted; preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique for organic-liquid separation)

IT IR spectra

Pervaporation

Polymer morphology

(preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique for organic-liquid separation)

IT Permeation

(vapor; preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique for organic-liquid separation)

IT 67-66-3, Chloroform, processes 110-54-3, n-Hexane, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)

(permeation and pervaporation of; preparation of organic/inorg. composite membranes by plasma-graft filling polymerization technique)

for organic-liquid separation)
 IT 96-33-3, Methyl acrylate 2177-18-6, Vinyl acrylate
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (preparation of organic/inorg. composite membranes by plasma-graft
 filling **polymerization** technique for organic-liquid separation)
 IT 96-33-3DP, Methyl acrylate, reaction products with porous glass, graft
 2177-18-6DP, Vinyl acrylate, reaction products with porous glass, graft
 RL: PEP (Physical, engineering or chemical process); SPN (Synthetic
 preparation); TEM (Technical or engineered material use); PREP
 (Preparation); PROC (Process); USES (Uses)
 (preparation of organic/inorg. composite membranes by plasma-graft
 filling **polymerization** technique for organic-liquid separation)
 RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 12 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STM

AN 1999:166547 HCAPLUS

DN 130:224121

TI Composite solid polymer **electrolyte membranes** and
 casting or extrusion of a composite **membrane**

IN Formato, Richard M.; Kovar, Robert F.; Osenar, Paul; Landrau, Nelson

PA Foster-Miller, Inc., USA

SO PCT Int. Appl., 70 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 4

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9910165	A1	19990304	WO 1998-US17898	19980828
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
CA 2300934	AA	19990304	CA 1998-2300934	19980828
AU 9892101	A1	19990316	AU 1998-92101	19980828
EP 1021296	A1	20000726	EP 1998-944594	19980828
R: DE, FR, GB, IT, SE				
JP 2001514431	T2	20010911	JP 2000-507525	19980828
US 6248469	B1	20010619	US 1999-261349	19990303
CA 2342237	AA	20000420	CA 1999-2342237	19990826
WO 2000022684	A2	20000420	WO 1999-US19476	19990826
WO 2000022684	A3	20000720		
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
AU 2000023415	A5	20000501	AU 2000-23415	19990826
CA 2342221	AA	20000504	CA 1999-2342221	19990826
WO 2000024796	A1	20000504	WO 1999-US19470	19990826
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG,				

KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX,
 NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,
 UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
 RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK,
 ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG,
 CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

EP 1115769 A1 20010718 EP 1999-965719 19990826

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
 IE, SI, LT, LV, FI, RO

JP 2003503510 T2 20030128 JP 2000-578363 19990826

JP 2003528420 T2 20030924 JP 2000-576501 19990826

PRAI US 1997-57233P P 19970829

WO 1998-US17898 W 19980828

US 1999-261349 A 19990303

US 1999-262861 A 19990303

WO 1999-US19470 W 19990826

WO 1999-US19476 W 19990826

AB Composite solid polymer **electrolyte membranes** (SPEMs)

include a porous polymer substrate interpenetrated with an ion-conducting material. The SPEMs are useful in electrochem. applications, including fuel cells, electrode separators, and electrodialysis. Thus, polybenzoxazole substrate film (solvent exchanged into NMP) was added to 5% solution containing sulfonated (75%) Radel R (I) and after 12 h placed into 20% solution of sulfonated I, and the composite film isolated, stretched, dried, and solvent extracted to give a film having resistance 0.056 Ω -cm²; vs. 0.203 for a Nafion 117 control film.

IC ICM B32B003-26

ICS B01D021-28; B01D024-00; B05D005-00; H01M008-10

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 52, 66, 72

ST ion conducting material composite **electrolyte membrane**

; porous polybenzoxazole film composite **electrolyte**

membrane; fuel cell composite **electrolyte**

membrane; electrodialysis composite **electrolyte**

membrane; sulfonated polyether sulfone composite

electrolyte membrane

IT Polyamides, uses

Polyketones

RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(aromatic; in composite solid polymer **electrolyte membranes**)

IT Heat-resistant materials

Membranes, nonbiological

(blend of porous polymer substrate and

ion conducting material; composite solid polymer **electrolyte**

membranes with low resistance, good strength and heat

resistance)

IT Polymer blends

RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(blend of porous polymer substrate and ion conducting material;

composite solid polymer **electrolyte membranes** with

low resistance, good strength and heat resistance)

IT Fuel cells

(composite solid polymer **electrolyte membranes** with

low resistance, good strength and heat resistance)

IT Primary batteries

(electrode separators; composite solid polymer **electrolyte**

membranes with low resistance, good strength and heat

resistance)

IT Dialyzers
(electrodialyzers; composite solid polymer **electrolyte membranes** with low resistance, good strength and heat resistance)

IT Liquid crystals, polymeric
(in composite solid polymer **electrolyte membranes**)

IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyimides, uses
Polyoxyphenylenes
Polysulfones, uses
Polythiophenylenes
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(in composite solid polymer **electrolyte membranes**)

IT Polysulfones, uses
Polysulfones, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polyether-, aromatic; in composite solid polymer **electrolyte membranes**)

IT **Polyimides**, uses
Polyimides, uses
Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polyether-; in composite solid polymer **electrolyte membranes**)

IT Polyethers, uses
Polyethers, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**polyimide**-; in composite solid polymer **electrolyte membranes**)

IT Polyethers, uses
Polyethers, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polyketone-; in composite solid polymer **electrolyte membranes**)

IT Polyquinoxalines
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polyphenylquinoxalines; in composite solid polymer **electrolyte membranes**)

IT Polyethers, uses
Polyethers, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polysulfone-, aromatic; in composite solid polymer **electrolyte membranes**)

IT Polyethers, uses
Polyethers, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(polysulfone-; in composite solid polymer **electrolyte membranes**)

IT 220998-11-8P, 6FDA-1,3-phenylenediamine-sodium 2,4-diaminobenzenesulfonate copolymer
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
 (imidized, sulfonated; in composite solid polymer **electrolyte membranes**)

IT 25135-51-7DP, Udel, sulfonated 25667-42-9DP, Ultrason E, sulfonated 27380-27-4DP, Victrex pek, sulfonated 154281-38-6DP, Radel R, sulfonated, sodium salts
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (in composite solid polymer **electrolyte membranes**)

IT 220998-11-8DP, sulfonated
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (in composite solid polymer **electrolyte membranes**)

IT 24938-64-5, p-Phenylenediamine-terephthalic acid copolymer, sru 25035-37-4, p-Phenylenediamine-terephthalic acid copolymer 25190-62-9, Poly(1,4-phenylene) 27028-97-3, Polyphenylene sulfide sulfone 31694-16-3, PEEK 63496-24-2, Nafion ew 1100
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (in composite solid polymer **electrolyte membranes**)

IT 220998-11-8P, 6FDA-1,3-phenylenediamine-sodium 2,4-diaminobenzenesulfonate copolymer
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
 (imidized, sulfonated; in composite solid polymer **electrolyte membranes**)

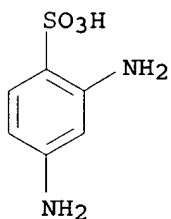
RN 220998-11-8 HCAPLUS

CN Benzenesulfonic acid, 2,4-diamino-, monosodium salt, polymer with 1,3-benzenediamine and 5,5'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[1,3-isobenzofurandione] (9CI) (CA INDEX NAME)

CM 1

CRN 3177-22-8

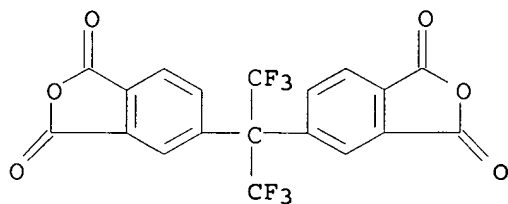
CMF C6 H8 N2 O3 S . Na



⊖ Na

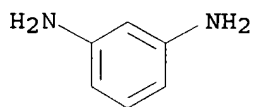
CM 2

CRN 1107-00-2
CMF C19 H6 F6 O6



CM 3

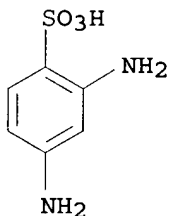
CRN 108-45-2
CMF C6 H8 N2



IT **220998-11-8DP**, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(in composite solid polymer **electrolyte membranes**)
RN 220998-11-8 HCAPLUS
CN Benzenesulfonic acid, 2,4-diamino-, monosodium salt, polymer with 1,3-benzenediamine and 5,5'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[1,3-isobenzofurandione] (9CI) (CA INDEX NAME)

CM 1

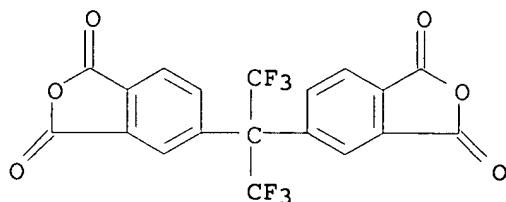
CRN 3177-22-8
CMF C6 H8 N2 O3 S . Na



● Na

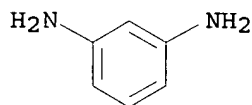
CM 2

CRN 1107-00-2
CMF C19 H6 F6 O6



CM 3

CRN 108-45-2
CMF C6 H8 N2



RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 13 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1997:547397 HCAPLUS
DN 127:150021
TI Alpha, beta, beta-trifluorostyrene- and its derivative-based polymer
composite membranes
IN Steck, Alfred E.; Stone, Charles
PA Ballard Power Systems Inc., Can.; Steck, Alfred E.; Stone, Charles
SO PCT Int. Appl., 62 pp.
CODEN: PIXXD2

DT Patent
LA English

FAN.CNT 6

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9725369	A1	19970717	WO 1997-CA3	19970103
	W: AU, CA, JP, US				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	US 5834523	A	19981110	US 1996-583638	19960105
	AU 9711872	A1	19970801	AU 1997-11872	19970103
	AU 704923	B2	19990506		
	EP 882088	A1	19981209	EP 1997-900054	19970103
	EP 882088	B1	20000705		
	R: AT, BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, SE				
	JP 2000502625	T2	20000307	JP 1997-524691	19970103
	AT 194366	E	20000715	AT 1997-900054	19970103
	US 2001056128	A1	20011227	US 2001-901269	20010709
	US 6437011	B2	20020820		
PRAI	US 1996-583638	A	19960105		
	US 1993-124924	A1	19930921		
	US 1995-442206	A2	19950516		
	WO 1997-CA3	W	19970103		

US 1999-441181 A1 19991115

AB The title membranes, particularly useful as membrane electrolytes in electrochem. fuel cells, are prepared by impregnating a porous substrate (e.g., of polyethylene, **PTFE**) with a polymeric composition comprising α,β,β -trifluorostyrene, and optionally substituted α,β,β -trifluorostyrene (e.g., m-trifluoromethyl- α,β,β -trifluorostyrene), and/or ethylene-based monomeric units.

IC ICM C08J005-22

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 76

ST trifluorostyrene deriv polymer composite membrane; polyethylene porous trifluorostyrene polymer composite membrane; **PTFE** porous trifluorostyrene polymer composite membrane; electrochem fuel cell trifluorostyrene polymer membrane

IT Carbon fibers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(paper electrodes for fuel cells; α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

IT Fluoropolymers, uses
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(porous substrates; α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

IT Fuel cells
Membranes, nonbiological
(α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

IT 26838-51-7DP, Poly(α,β,β -trifluorostyrene), sulfonated
188050-58-0P, p-Sulfonylfluoride- α,β,β -trifluorostyrene-m-trifluoromethyl- α,β,β -trifluorostyrene-
 α,β,β -trifluorostyrene copolymer 193218-67-6P, m-Trifluoromethyl- α,β,β -trifluorostyrene-
 α,β,β -trifluorostyrene copolymer
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(impregnated into porous substrates; α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

IT 9002-84-0, **PTFE** 9002-88-4, Polyethylene
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(porous substrates; α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

IT 193218-67-6DP, m-Trifluoromethyl- α,β,β -trifluorostyrene-
 α,β,β -trifluorostyrene copolymer, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

IT 9002-84-0, **PTFE**
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(porous substrates; α,β,β -trifluorostyrene- and its derivative-based polymer composite membranes)

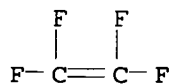
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L23 ANSWER 14 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1986:69322 HCAPLUS

DN 104:69322

TI Preparation of conductive porous films

IN Tamura, Shohei; Sasaki, Sadamitsu; Sasaki, Takeshi; Nakamoto, Keiji; Nakazawa, Jun; Abe, Masao

PA Nitto Electric Industrial Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

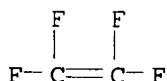
DT Patent

LA Japanese

FAN.CNT 4

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 60148011	A2	19850805	JP 1984-4121	19840111
	EP 152632	A2	19850828	EP 1984-116451	19841228
	EP 152632	A3	19860108		
	EP 152632	B1	19891213		
	R: DE, FR, GB				
	US 4556623	A	19851203	US 1984-688119	19841231
PRAI	JP 1983-252135	A	19831230		
	JP 1984-4121	A	19840111		
	JP 1984-4122	A	19840111		
	JP 1984-231848	A	19841101		
AB	Conductive porous films are prepared by dipping a porous film (applied to an anode) in an aniline solution containing a protic acid (>1 equivalent of the aniline), electrolytically oxidation-polymerizing the aniline, and precipitating a conductive polymer on the porous film. The preparation provides a stable and high-conductive film, and enables controlling dopant electrochem. Thus, 2 Pt electrodes were dipped in 10 weight% aqueous aniline HCl; a Na-treated PTFE porous film (Polyflon paper) was applied to the anode, followed by elec. treatment 1 h with initial electrolytic voltage +2.2 V to SCE and constant c.d. 10 mA/cm ² to give a conductive porous film with conductivity 2.5 + 10 ⁻¹ S/cm.				
IC	ICM H01B013-00				
	ICS C08G073-00; H01B001-12; H01B005-14				
CC	35-4 (Chemistry of Synthetic High Polymers)				
	Section cross-reference(s): 76				
ST	aniline polymer conductive porous film; PTFE aniline polymer film; electrolysis oxidn polymn aniline				
IT	Electric conductors				
	(aniline homopolymer films, preparation of, on porous film substrates)				
IT	Polymerization				
	(electrochem., oxidative, of aniline salts)				
IT	94750-31-9P 100290-51-5P				
	RL: PREP (Preparation)				
	(films, electroconductive, preparation of, on porous film substrates)				
IT	9002-84-0 9003-07-0				
	RL: USES (Uses)				
	(porous films, substrates for electroconductive aniline polymer films)				

IT 9002-84-0
 RL: USES (Uses)
 (porous films, substrates for electroconductive
 aniline polymer films)
 RN 9002-84-0 HCAPLUS
 CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)
 CM 1
 CRN 116-14-3
 CMF C2 F4



L23 ANSWER 15 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1982:443572 HCAPLUS

DN 97:43572

TI Method and device for the detection and measurement of electrochemically active compounds

IN Stetter, Joseph R.; Rutt, Donald R.

PA Becton, Dickinson and Co., USA

SO U.S., 8 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4326927	A	19820427	US 1980-172170	19800725
PRAI	US 1980-172170		19800725		

AB The title device, is useful for determining a noxious gas in the presence of CO, comprises a sensing electrode, a counterelectrode, and an **electrolyte** in contact with the sensing electrode and counter electrode. The sensing electrode comprises a porous hydrophobic poly(tetrafluoroethylene) [9002-84-0] substrate with a vapor-deposited or -sputtered porous Au film catalysts (thickness 200-20,000 Å) to provide a diffusion electrode. The device has a means for exposing the sensing electrode to gas to be detected, a means for elec. coupling to the sensing electrode to maintain the electrode at a potential of .apprx.0.4-1.5 V with respect to the potential of the reversible H couple in the **electrolyte** of the device, and a means for measuring the current flowing between the sensing electrode and the counterelectrode, which is a measure of the concentration of the noxious gas being detected. Such a sensor containing an anode and cathode each comprising a Teflon membrane having a 2500-Å layer of Au and a Pt/air reference electrode showed a high selectivity for H₂S in the presence of CO.

IC G01N027-46; G01N027-52

INCL 204-1T

CC 59-1 (Air Pollution and Industrial Hygiene)

Section cross-reference(s): 79

ST hydrogen sulfide detn air app; carbon monoxide presence air analysis; electrochem app pollutant detn air; gold polytetrafluoroethylene electrode air analysis

IT Air analysis

- (hydrogen sulfide determination in, in presence of carbon monoxide, apparatus for)
- IT 7783-06-4, analysis
RL: ANT (Analyte); POL (Pollutant); ANST (Analytical study); OCCU (Occurrence)
(determination of, in air, in presence of carbon monoxide, electrochem. cell for)
- IT 9002-84-0
RL: OCCU (Occurrence)
(gold-coated, electrode, in electrochem. cell for determination of hydrogen sulfide in air in presence of carbon monoxide)
- IT 630-08-0, uses and miscellaneous
RL: USES (Uses)
(hydrogen sulfide determination in air in presence of, apparatus for)
- IT 7440-57-5, uses and miscellaneous
RL: USES (Uses)
(poly(tetrafluoroethylene) film coated with, electrode, in electrochem. cell for determination of hydrogen sulfide in air in presence of carbon monoxide)
- L23 ANSWER 16 OF 16 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1967:460275 HCAPLUS
DN 67:60275
TI Mechanism of the operation of gas electrodes with a plastic (hydrophobic)base II. Behavior of the electrode in a slotted gap
AU Osetrova, N. V.; Bagotskii, V. S.
CS Inst. Elektrokhim, Moscow, USSR
SO Elektrokhiimiya (1967), 3(5), 638-4
CODEN: ELKKAX; ISSN: 0424-8570
DT Journal
LA Russian
AB The behavior of a Ag-O electrode in N KOH solns., in the narrow gap between the electrode and the screen containing both hydrophobic and hydrophilic regions of the surface was investigated. The complex cylindrical electrode described previously (loc. cit.) was equipped with cylindrical screens loosely covering the electrode and made of either Pt (hydrophilic and elec. isolated from the anode) or **Teflon** (hydrophobic). Slots in the screen provided for improved circulation of **electrolyte**. The relation between current and the depth of the submerged part of the electrode was determined under constant potential. The effect of the hydrophilic screen on the current was of minor importance, even when the depth of the immersion changed over the entire length of the complex cylindrical electrode. The current decayed rapidly with time due to concentration polarization as a result of complete flooding of the gap between the screen and the electrode. When hydrophobic screens were used, the shape of the current-depth curves changed completely. A totally submerged electrode displayed a current corresponding to the diffusion current of an electrode with no screen under the same conditions. This value remained constant as the electrode emerged, until the Ag ring was several mm. above the **electrolyte** surface. At this point, the current increased abruptly and the effect continued until the electrode emerged completely. The kink near the abrupt change corresponds to different depths, depending on whether the electrode emerges or submerges, i.e. a hysteresis phenomena was observed. The polarization curves suggest a diffusion relation when the electrode is deeply submerged. The ohmic drop in the gap is rather low. The size of the gap (0.1-0.4 mm.) determine the value of the current and the characteristics of the system, and the effect of the screen disappears with a gap width >2 mm. The effect of hydrophobic screens, in spite of the poor wetting of **Teflon** results in the formation of a low-ohmic **electrolyte** film in the gap between the electrode and the screen having a large area and gas transfer properties. Impedance

measurements show decrease of the elec. resistance of the film above the meniscus when a screen is used. Although the polarization characteristics remain identical, the hydrophilic O electrodes require a very accurate adjustment of the distance between the active zone and the meniscus, hence a precise control of pressure, to obtain maximum current. Hydrophobic electrodes on the other hand are not as sensitive to the maximum current critical distance, so the variation of the pressure does not affect optimum performance, thus a larger part of the catalyst is used. These assumptions were confirmed by comparing the performance of **glass** and **Teflon porous substrates** with C, pyrographite, Pt, and Ag catalysts working as O fuel-cell electrodes in acidic or alkaline media. O pressure was kept constant in all cases. **Teflon** substrates increase the activity of all the investigated catalysts.

CC 77 (Electrochemistry)

ST GAS ELECTRODES FUEL CELLS; FUEL CELLS GAS ELECTRODES; OXYGEN ELECTRODES FUEL CELLS

IT Electrodes

(reference, oxygen on silver, hydrophilic and hydrophobic surfaces in relation to)

IT 7782-44-7, uses and miscellaneous

RL: USES (Uses)

(electrodes, on silver, hydrophilic and hydrophobic surfaces in relation to)

=> => D QUE

L2 3 SEA FILE=REGISTRY ABB=ON (7440-37-1/BI OR 9002-84-0/BI OR 9003-01-4/BI)

L5 808714 SEA FILE=HCAPLUS ABB=ON L2 OR SIO2 OR TIO2 OR ZRO2 OT SILICA OR TITANIA OR ZIRCONIA OR (ZIRCONIUM OR TITANIUM OR SILICON) (W) (OXIDE OR DIOXIDE)

L8 1361 SEA FILE=HCAPLUS ABB=ON (L5 OR INORG? OR GLASS? OR CERAMIC?) (3 A) SUBSTRATE? (6A) (POROS? OR POROUS OR PORE#)

L9 9 SEA FILE=HCAPLUS ABB=ON (HEAT? OR THERM?) (2A) RESIST? (4A) (?POLYMER? OR RESIN#) (3A) SUBSTRATE? (6A) (POROS? OR POROUS OR PORE#)

L10 54257 SEA FILE=REGISTRY ABB=ON PI/PCT

L11 76 SEA FILE=HCAPLUS ABB=ON (L8 OR L9) AND (GRAFT? (3A) ?POLYMER? OR PTFE OR POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID? OR L10)

L12 14 SEA FILE=HCAPLUS ABB=ON L11 AND ELECTROLYT?

L13 32 SEA FILE=HCAPLUS ABB=ON L11 AND MEMBRAN?

L14 6 SEA FILE=HCAPLUS ABB=ON L11 AND SWELL?

L15 4 SEA FILE=HCAPLUS ABB=ON L11 AND PROTON? (3A) CONDUCT?

L16 15 SEA FILE=HCAPLUS ABB=ON L12 OR L14 OR L15

L18 9 SEA FILE=HCAPLUS ABB=ON L13 AND ELECTROCHEM?/SC, SX

L19 15 SEA FILE=HCAPLUS ABB=ON L16 OR L18

L20 20 SEA FILE=HCAPLUS ABB=ON L13 NOT L19

L22 1 SEA FILE=HCAPLUS ABB=ON L20 AND (FUEL (2A) CELL# OR BATTER?)

L23 16 SEA FILE=HCAPLUS ABB=ON L19 OR L22

L27 698 SEA FILE=HCAPLUS ABB=ON (ZRO2 OR SILICA) (3A) (SUBSTRATE? OR BASE#) (6A) (POROUS OR PORE# OR POROS?)

L28 10 SEA FILE=HCAPLUS ABB=ON L27 AND (GRAFT? (3A) ?POLYMER? OR PTFE OR POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID? OR L10)

L30 1 SEA FILE=HCAPLUS ABB=ON L28 AND (ELECTROLYT? OR (MEMBRAN? AND (FUEL (2A) CELL# OR BATTER?)) OR ELECTROCHEM?/SC, SX)

L31 2681 SEA FILE=HCAPLUS ABB=ON (L5 OR INORG? OR GLASS? OR CERAMIC?) (3 A) (BASE# OR SUBSTRATE?) (6A) (POROS? OR POROUS OR PORE#)

L32 96 SEA FILE=HCAPLUS ABB=ON L31 AND (GRAFT? (3A) ?POLYMER? OR PTFE OR POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID? OR L10)

L33 21 SEA FILE=HCAPLUS ABB=ON L32 AND (ELECTROLYT? OR (MEMBRAN? AND
(FUEL(2A)CELL# OR BATTER?)) OR ELECTROCHEM?/SC,SX)
L34 21 SEA FILE=HCAPLUS ABB=ON L33 OR L30
L35 8 SEA FILE=HCAPLUS ABB=ON (L34 OR L23) NOT L23

=> D L35 1-8 BIB ABS IND HITSTR

L35 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:512782 HCAPLUS

DN 141:57095

TI Fuel cell substrate, its manufacture, and fuel cell electrode

IN Suzuki, Shuichi

PA Sanyo Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004179095	A2	<u>20040624</u>	JP 2002-346591	20021128
PRAI	JP 2002-346591		20021128		

AB The substrate contains a conductive porous base material; where the base material has a crosslinkable polymer coated on its surface. The substrate is manufactured by impregnating the base material with a water repellent polymer dispersion liquid; drying the dispersion liquid impregnated base material; and heat treating to crosslink the water repellent polymer. The electrode contains the above substrate and a catalyst layer.

IC ICM H01M008-02

ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell substrate polymer coated porous material manuf electrode

IT Fuel cell electrodes

(manufacture of substrates containing polymer coated porous base materials for fuel cell electrodes)

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)

(manufacture of substrates containing polymer coated porous base materials for fuel cell electrodes)

IT 7440-44-0, Carbon, uses 9002-84-0, PTFE

RL: DEV (Device component use); USES (Uses)

(manufacture of **substrates** containing polymer coated **porous** base materials for fuel cell electrodes)

IT 9002-84-0, PTFE

RL: DEV (Device component use); USES (Uses)

(manufacture of **substrates** containing polymer coated **porous** base materials for fuel cell electrodes)

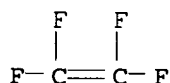
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L35 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2002:672608 HCAPLUS

DN 137:202356

TI Ion-conducting adhesive porous films, polymer gel **electrolytes**
from them, their manufacture, and applications

IN Yamaguchi, Mutsuko; Uetani, Yoshihiro; Kii, Keisuke; Yamamura, Takashi;
Nakamura, Seiji; Tabuchi, Masato

PA Nitto Denko Corp., Japan; Daiso Co., Ltd.

SO Jpn. Kokai Tokkyo Koho, 20 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002249742	A2	20020906	JP 2001-358853	20011126
PRAI	JP 2000-373466	A	20001207		
AB	The films, showing 180° peeling strength ≥ 2 N/20 mm, comprise porous base films and polymers having poly(meth)acrylate, poly(ethylene oxide), poly(propylene oxide), poly(ethylene oxide/propylene oxide), polyphosphazene, poly(vinyl ether), or polysiloxane main chains and oligo(alkylene oxide) side chains. Polymer gel electrolytes manufactured using them are useful for batteries and capacitors. Thus, porous ultrahigh-mol.-weight polyethylene film was coated with a composition containing glycidyl methoxyethoxyethyl ether-allyl glycidyl ether-ethylene oxide (49:51:1) copolymer and Blemmer PDE 100, soaked in a solution containing LiClO ₄ , and heated to give a gel showing conductivity 8.0 + 10 ⁻⁴ S/cm.				
IC	ICM C09J007-02 ICS C08J009-36; C09J009-02; C09J171-00; C09J183-12; C09J201-00; H01B001-06; H01B013-00; H01G009-02; H01G009-035; H01G009-038; H01M010-40; C08L101-00				
CC	38-3 (Plastics Fabrication and Uses) Section cross-reference(s): 52, 76				
ST	ion conducting adhesive porous film electrolyte ; glycidyl ether polymer gel electrolyte battery; capacitor gel electrolyte adhesive porous film				
IT	Porous materials (films; ion-conducting adhesive porous films for polymer gel electrolytes)				
IT	Capacitors Electrolytes Primary batteries Secondary batteries (ion-conducting adhesive porous films for polymer gel electrolytes)				
IT	Polyethers, uses RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (oligo(alkylene oxide) side chain-containing; ion-conducting adhesive porous films for polymer gel electrolytes)				
IT	Polyoxyalkylenes, uses Polyphosphazenes Polysiloxanes, uses				

RL: TEM (Technical or engineered material use); USES (Uses)
 (oligo(alkylene oxide) side chain-containing; ion-conducting adhesive
 porous films for polymer gel **electrolytes**)

IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous base film; ion-conducting adhesive porous films for polymer gel
electrolytes)

IT Films
 (porous; ion-conducting adhesive porous films for polymer gel
electrolytes)

IT 7791-03-9, Lithium perchlorate
 RL: TEM (Technical or engineered material use); USES (Uses)
 (**electrolyte**; ion-conducting adhesive porous films for
 polymer gel **electrolytes**)

IT 115383-11-4P
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT
 (Reactant or reagent)
 (ion-conducting adhesive porous films for polymer gel
electrolytes)

IT 454171-46-1P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (ion-conducting adhesive porous films for polymer gel
electrolytes)

IT 9002-84-0, PTFE
 RL: TEM (Technical or engineered material use); USES (Uses)
 (**porous base** film; ion-conducting adhesive
porous films for polymer gel **electrolytes**)

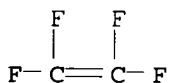
IT 9002-88-4, Polyethylene
 RL: TEM (Technical or engineered material use); USES (Uses)
 (ultrahigh-mol.-weight, porous base film; ion-conducting adhesive porous
 films for polymer gel **electrolytes**)

IT 9002-84-0, PTFE
 RL: TEM (Technical or engineered material use); USES (Uses)
 (**porous base** film; ion-conducting adhesive
porous films for polymer gel **electrolytes**)

RN 9002-84-0 HCAPLUS
 CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3
 CMF C2 F4



L35 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2000:667012 HCAPLUS
 DN 133:240625
 TI Gas diffusion substrate and porous gas diffusion electrode for fuel cells
 IN Brown, Karen Leanne; Gascoyne, John Malcolm; Ralph, Thomas Robertson
 PA Johnson Matthey Public Limited Company, UK
 SO PCT Int. Appl., 21 pp.
 CODEN: PIXXD2
 DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000055933	A1	20000921	WO 2000-GB382	20000209
	W: CA, JP, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	CA 2368258	AA	20000921	CA 2000-2368258	20000209
	EP 1169743	A1	20020109	EP 2000-902732	20000209
	EP 1169743	B1	20051005		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2002539596	T2	20021119	JP 2000-605279	20000209
	AT 306124	E	20051015	AT 2000-902732	20000209
	US 6531240	B1	20030311	US 2001-936547	20010914
PRAI	GB 1999-5950	A	19990316		
	WO 2000-GB382	W	20000209		
AB	A novel gas diffusion substrate comprising a porous structure and a filler material, is characterized in that the filler material comprises a base filler material which is elec. conducting and carbonaceous and one or more modifier materials which are hydrophilic in nature relative to the base filler material; a porous gas diffusion electrode comprising the substrate and the use of the substrate or electrode in a fuel cell is disclosed.				
IC	ICM H01M004-86				
	ICS H01M004-66				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)				
ST	fuel cell gas diffusion electrode substrate				
IT	Synthetic fibers				
	RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)				
	(ceramic; gas diffusion substrate and porous gas diffusion electrode for fuel cells)				
IT	Catalysts				
	(electrocatalysts; gas diffusion substrate and porous gas diffusion electrode for fuel cells)				
IT	Ceramics				
	(fibers; gas diffusion substrate and porous gas diffusion electrode for fuel cells)				
IT	Polyoxyalkylenes, uses				
	RL: DEV (Device component use); USES (Uses)				
	(fluorine- and sulfo-containing, ionomers; gas diffusion substrate and porous gas diffusion electrode for fuel cells)				
IT	Polyoxyalkylenes, uses				
	RL: DEV (Device component use); USES (Uses)				
	(fluorine-containing, sulfo-containing, ionomers; gas diffusion substrate and porous gas diffusion electrode for fuel cells)				
IT	Precious metals				
	Transition metal oxides				
	Transition metals, uses				
	RL: CAT (Catalyst use); USES (Uses)				
	(gas diffusion substrate and porous gas diffusion electrode for fuel cells)				
IT	Glass fibers, uses				
	Glass spheres				
	Zeolites (synthetic), uses				
	RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)				
	(gas diffusion substrate and porous gas diffusion electrode for fuel cells)				

electrode for fuel cells)

IT Fluoropolymers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT Fuel cell electrodes
(gas diffusion; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT Synthetic fibers
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(silica; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT Ceramics
(spheres; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT Carbon fibers, uses
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(wool; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT 7631-86-9, Fumed silica, uses
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(colloidal; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT 163294-14-2, Nafion 112
RL: DEV (Device component use); USES (Uses)
(gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT 9002-84-0, Ptfе
RL: TEM (Technical or engineered material use); USES (Uses)
(gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(spheres; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

IT 14808-60-7, Quartz, uses
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(wool; gas diffusion substrate and porous gas diffusion electrode for fuel cells)

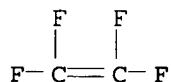
IT 9002-84-0, Ptfе
RL: TEM (Technical or engineered material use); USES (Uses)
(gas diffusion substrate and porous gas diffusion

electrode for fuel cells)
 RN 9002-84-0 HCAPLUS
 CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L35 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1998:428130 HCAPLUS

DN 129:97743

TI Porous electrode substrate for electrochemical fuel cell

IN Campbell, Stephen A.; Stumper, Juergen; Wilkinson, David P.; Davis, Michael T.

PA Ballard Power Systems Inc., Can.

SO PCT Int. Appl., 35 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9827606	A1	19980625	WO 1997-CA359	19970526
	W: AU, CA, DE, GB, JP, US				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	US 5863673	A	19990126	US 1996-768650	19961218
	AU 9728827	A1	19980715	AU 1997-28827	19970526
	AU 724783	B2	20000928		
	EP 950266	A1	19991020	EP 1997-922778	19970526
	EP 950266	B1	20020403		
	R: CH, DE, FR, GB, IT, LI				
	JP 2001514785	T2	20010911	JP 1998-527131	19970526
	CA 2274975	C	20031202	CA 1997-2274975	19970526
	CA 2274975	AA	19980625		
PRAI	US 1996-768650	A	19961218		
	US 1995-574262	A2	19951218		
	WO 1997-CA359	W	19970526		

AB The substrate comprises ≥ 1 preformed web having low elec. conductivity (e.g., through-plane resistivity $> 1 \Omega\text{-cm}$) and containing elec. conductive filler. The preformed web is a nonwoven fabric of carbon fibers and a binder. The preformed web consists essentially of a polymeric material. The filler comprises C particles or B₄C.

IC ICM H01M004-96

ICS H01M004-86; H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

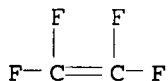
Section cross-reference(s): 38, 40

ST electrode substrate fuel cell preformed web; carbon fiber preformed web electrode substrate; polymeric preformed web electrode substrate; filler carbon preformed web electrode substrate; boron carbide preformed web

electrode substrate
 IT Carbon fibers, uses
 Fluoropolymers, uses
 Glass fibers, uses
 Polyolefins
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous electrode substrate for electrochem. fuel cell from
 filler-containing)
 IT Fuel cell cathodes
 Fuel cell electrodes
 (porous substrate for)
 IT 9002-84-0, PTFE 24938-64-5, Poly(p-phenylene
 terephthalamide)
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous electrode substrate for electrochem. fuel
 cell from filler-containing)
 IT 12069-32-8, Boron carbide (B4C)
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous electrode substrate for electrochem. fuel cell from preformed
 web containing)
 IT 7440-44-0, Carbon, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous electrode substrate for electrochem. fuel cell from preformed
 web containing particles of)
 IT 9002-84-0, PTFE
 RL: TEM (Technical or engineered material use); USES (Uses)
 (porous electrode substrate for electrochem. fuel
 cell from filler-containing)
 RN 9002-84-0 HCAPLUS
 CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3
 CMF C2 F4



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L35 ANSWER 5 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 1995:549402 HCAPLUS
 DN 122:270089
 TI Air battery capable of discharging under high load
 IN Konishi, Hajime; Yokoyama, Takashi; Soma, Naoko; Morita, Koreyoshi
 PA Matsushita Electric Ind Co Ltd, Japan
 SO Jpn. Kokai Tokkyo Koho, 4 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	-----
PI	JP 07037624	A2	19950207	JP 1993-184787	19930727
PRAI	JP 1993-184787		19930727		

AB The air battery has provision for absorbing CO₂ to improve discharging characteristics under low and high load. The provision is a porous substrate impregnated with an amino or hydroxyl group-containing compound enclosed in a porous resin film having pores 0.05-1 μm in diameter

IC ICM H01M012-06

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST air battery carbon dioxide absorbing

IT Batteries, primary
(air; air battery equipped with carbon dioxide-absorbing layers for improved discharging characteristics)

IT 141-43-5, Monoethanolamine, uses
RL: NUU (Other use, unclassified); USES (Uses)
(agent for absorbing carbon dioxide; air battery equipped with carbon dioxide-absorbing layers for improved discharging characteristics)

IT 9002-84-0, PTFE
RL: DEV (Device component use); USES (Uses)
(porous substrate; air battery equipped with carbon dioxide-absorbing layers for improved discharging characteristics)

IT 9002-84-0, PTFE
RL: DEV (Device component use); USES (Uses)
(porous substrate; air battery equipped with carbon dioxide-absorbing layers for improved discharging characteristics)

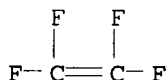
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L35 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1991:586746 HCAPLUS

DN 115:186746

TI Gas-diffusion electrodes and liquid fuel cells using the electrodes

IN Yanagihara, Nobuyuki; Uchida, Makoto; Tanabe, Mieko

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 03078968	A2	19910404	JP 1989-216431	19890822
	JP 2890513	B2	19990517		
PRAI	JP 1989-216431		19890822		

AB The electrodes have a porous gas-diffusion layer of a hydrophobic resin-fine C powder mixture pressed between a porous reaction layer of catalyst-laden fine C powder and a conductive porous substrate, where the substrate contains a layer of powdered hydrophobic plastic or a porous hydrophobic plastic film. Preferably, the plastic powder or film is a fluoropolymer, and the substrate is selected from hydrophobically treated

carbon fibers, nonwoven cloth, and felt. Liquid fuel cells use these electrodes as their cathodes and/or anodes. The substrate may also be metal fibers, porous metals, or metal-coated carbon fibers for anodes.

IC ICM H01M004-86
ICS H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell gas diffusion electrode; carbon fluoropolymer gas diffusion electrode

IT Carbon fibers, uses and miscellaneous
RL: USES (Uses)
(electrode substrates, containing powder layers or porous films of fluoropolymers, for liquid fuel cells)

IT Electrodes
(fuel-cell, gas-diffusion, substrates containing powder layers or porous films of fluoropolymers for)

IT 7440-44-0
RL: USES (Uses)
(carbon fibers, electrode substrates, containing powder layers or porous films of fluoropolymers, for liquid fuel cells)

IT 9002-84-0, PTFE 25067-11-2
RL: USES (Uses)
(electrodes with **substrates** containing powder layers or **porous** films of, gas-diffusion, for liquid fuel cells)

IT 9002-84-0, PTFE
RL: USES (Uses)
(electrodes with **substrates** containing powder layers or **porous** films of, gas-diffusion, for liquid fuel cells)

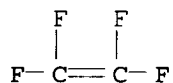
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



L35 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1984:124104 HCAPLUS

DN 100:124104

TI Fuel cells

PA Hitachi, Ltd., Japan; Hitachi Chemical Co., Ltd.

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 58166643	A2	19831001	JP 1982-49501	19820327
PRAI	JP 1982-49501		19820327		
AB	Fuel cells contain gas-diffusion electrodes of a porous electrode base , C powder, PTFE [9002-84-0] or a PTFE -C mixture, and ≥ 1 catalyst layer containing ≥ 1				

Group VIII element. Thus, a **PTFE**-acetylene black mixture was coated on a C sheet, dried, coated with a colloidal Pt solution prepared by reduction of a $\text{H}_2\text{PtCl}_6\text{-MeOH}$ poly(vinyl alc.) solution, and heated to prepare an air cathode. The electromotive force of the cathode was higher than that of the cathode with no **PTFE**-acetylene black coating. The method conserves Pt.

IC H01M004-86
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST cathode air fuel cell; **PTFE** air cathode; carbon black air cathode; platinum air cathode fuel cell
IT Carbon black, uses and miscellaneous
RL: USES (Uses)
(cathodes containing, air platinum catalytic, fuel-cell)
IT Cathodes
(fuel-cell, catalytic, platinum air)
IT 9002-84-0
RL: USES (Uses)
(cathodes containing, air platinum catalytic, fuel-cell)
IT 7440-06-4, uses and miscellaneous
RL: USES (Uses)
(cathodes, air catalytic, fuel-cell)

L35 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1974:90730 HCAPLUS
DN 80:90730
TI Potentiometric determination of chloride and bromide ions in water by using porous silver chloride and bromide electrodes
AU Moskvina, L. N.; Leont'eva, R. G.; Fokina, R. G.; Bredikhina, E. P.
CS USSR
SO Zhurnal Analiticheskoi Khimii (1973), 28(12), 2384-8
CODEN: ZAKHA8; ISSN: 0044-4502
DT Journal
LA Russian
AB Properties of AgCl and AgBr electrodes prepared on a mech. stable, inert, porous base made of glass and polytetrafluoroethylene (I) were tested in order to increase the accuracy of direct potentiometric determination of Cl^- and Br^- in H_2O . The electrodes based on a porous glass plate have greater mech. strength, but those based on I are easier to prepare. The p.d. of the flow-through porous electrodes remains stable until the AgCl in the working volume is dissolved. The potentials are independent of the solution flow rate ≤ 30 ml/cm²-min. With proper thermostating, the error is $\leq 10\%$ at low concns. of Cl^- and Br^- and decreases to 2-3% at higher concns.

CC 79-6 (Inorganic Analytical Chemistry)
Section cross-reference(s): 77
ST chloride detn electrode; bromide detn electrode; electrode chloride bromide detn; silver chloride bromide electrode
IT Electrodes
(porous silver halide, for potentiometric determination of halides)
IT Glass
RL: ANST (Analytical study)
(porous, as support for silver and silver halides in electrodes for potentiometric determination of halides)
IT 7732-18-5, analysis
RL: ANST (Analytical study)
(bromide and chloride determination, porous silver halide electrodes for potentiometric)
IT 24959-67-9

RL: ANT (Analyte); ANST (Analytical study)
(determination of, porous silver bromide electrodes for potentiometric)

IT 16887-00-6
RL: ANT (Analyte); ANST (Analytical study)
(determination of, porous silver chloride electrodes for potentiometric)

IT 7785-23-1
RL: ANST (Analytical study)
(electrodes with silver, for determination of bromide, porous glass and
polytetrafluoroethylene supports for)

IT 7783-90-6
RL: ANST (Analytical study)
(electrodes with silver, for determination of chloride, porous glass and
polytetrafluoroethylene supports for)

IT 7440-22-4, uses and miscellaneous
RL: USES (Uses)
(electrodes, with silver bromide and silver chloride on porous glass
and **polytetrafluoroethylene** supports, for potentiometric
determination of bromide and chloride)

IT 9002-84-0
RL: ANST (Analytical study)
(impregnated with silver and silver halides, for electrodes for halide
determination)

=> => FILE WPIX

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=> D QUE

L2 3 SEA FILE=REGISTRY ABB=ON (7440-37-1/BI OR 9002-84-0/BI OR
9003-01-4/BI)

L5 808714 SEA FILE=HCAPLUS ABB=ON L2 OR SIO2 OR TIO2 OR ZRO2 OT SILICA
OR TITANIA OR ZIRCONIA OR (ZIRCONIUM OR TITANIUM OR SILICON) (W)
(OXIDE OR DIOXIDE)

L8 1361 SEA FILE=HCAPLUS ABB=ON (L5 OR INORG? OR GLASS? OR CERAMIC?) (3
A) SUBSTRATE? (6A) (POROS? OR POROUS OR PORE#)

L9 9 SEA FILE=HCAPLUS ABB=ON (HEAT? OR THERM?) (2A) RESIST? (4A) (?POLY
MER? OR RESIN#) (3A) SUBSTRATE? (6A) (POROS? OR POROUS OR PORE#)

L10 54257 SEA FILE=REGISTRY ABB=ON PI/PCT

L11 76 SEA FILE=HCAPLUS ABB=ON (L8 OR L9) AND (GRAFT? (3A) ?POLYMER?
OR PTFE OR POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID? OR
L10)

L12 14 SEA FILE=HCAPLUS ABB=ON L11 AND ELECTROLYT?

L14 6 SEA FILE=HCAPLUS ABB=ON L11 AND SWELL?

L15 4 SEA FILE=HCAPLUS ABB=ON L11 AND PROTON? (3A) CONDUCT?

L24 7 SEA FILE=WPIX ABB=ON L12 OR L14 OR L15

L27 698 SEA FILE=HCAPLUS ABB=ON (ZRO2 OR SILICA) (3A) (SUBSTRATE? OR
BASE#) (6A) (POROUS OR PORE# OR POROS?)

L36 2 SEA FILE=WPIX ABB=ON L27 AND (GRAFT? (3A) ?POLYMER? OR PTFE OR
POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID? OR L10)

L37 1669 SEA FILE=WPIX ABB=ON (L5 OR INORG? OR GLASS? OR CERAMIC?) (3A) (
BASE# OR SUBSTRATE?) (6A) (POROS? OR POROUS OR PORE#)

L38 40 SEA FILE=WPIX ABB=ON L37 AND (GRAFT? (3A) ?POLYMER? OR PTFE OR
POLYTETRAFLUOROETHYLENE OR TEFLON OR POLYIMID?)

L39 9 SEA FILE=WPIX ABB=ON (L36 OR L38) AND ELECTROLYT?

L40 5 SEA FILE=WPIX ABB=ON L24 AND (H01M? OR H01B?)/IC

L41 9 SEA FILE=WPIX ABB=ON L39 OR L40

=> D FULL L41 1-9

L41 ANSWER 1 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2006-088564 [09] WPIX

DNN N2006-077003 DNC C2006-031908

TI Organic/inorganic composite porous film for making electrochemical device,
i.e. lithium secondary battery, has active layer formed by coating surface
of substrate or part of its pores with mixture of inorganic particles and
binder polymer.

DC A85 L03 P73 X16

IN AHN, S H; KIM, S K; LEE, S Y; SUK, J D; YONG, H H; AHN, S; KIM, S; LEE, S;
SUK, J; YONG, H

PA (AHNS-I) AHN S H; (KIMS-I) KIM S K; (LEES-I) LEE S Y; (SUKJ-I) SUK J D;
(YONG-I) YONG H H; (GLDS) LG CHEM LTD

CYC 110

PI US 2006008700 A1 20060112 (200609)* 17 H01M002-16 <--
WO 2006004366 A1 20060112 (200609) EN H01M002-16 <--
RW: AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IS IT
KE LS LT LU LV MC MW MZ NA NL OA PL PT RO SD SE SI SK SL SZ TR TZ
UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE
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KM KP KZ LC LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NG NI NO
NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SM SY TJ TM TN TR TT TZ
UA UG UZ VC VN YU ZA ZM ZW

ADT US 2006008700 A1 US 2005-175881 20050706; WO 2006004366 A1 WO 2005-KR2133
20050705

PRAI KR 2004-70097 20040902; KR 2004-52638 20040707

IC ICM H01M002-16
ICS B32B019-00; B32B019-02

AB US2006008700 A UPAB: 20060206
NOVELTY - An organic/inorganic composite porous film, comprises a porous

substrate having pores; and an active layer formed by coating a surface of substrate or part of pores in the substrate with mixture of inorganic particles and binder polymer. The inorganic particles in active layer are interconnected among themselves and are fixed by binder polymer. Interstitial volumes among the inorganic particles form a pore structure.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(A) a electrochemical device comprising a cathode; an anode; an organic/inorganic composite porous film, which is interposed between the cathode and anode; and an electrolyte; and

(B) a method for manufacturing an organic/inorganic composite porous film, comprising dissolving a binder polymer into a solvent to form a polymer solution; adding inorganic particles to the polymer solution and mixing them; and coating the mixture of inorganic particles with binder polymer on the surface of a substrate having pores or on a part of the pores in the substrate, followed by drying.

USE - The composite porous film is used for manufacturing an electrochemical device, which is a lithium secondary battery (claimed), useful as energy sources in portable phones, camcorders, notebook computers, PCs and electric cars.

ADVANTAGE - The organic/ inorganic composite porous film shows excellent thermal safety and lithium ion conductivity and a high degree of swelling with electrolyte. The electrochemical device comprising the organic/inorganic composite porous film shows improved safety and quality, simultaneously.

DESCRIPTION OF DRAWING(S) - The figure is a schematic view showing an organic/inorganic composite porous film.

Dwg.1/8

TECH US 2006008700 A1UPTX: 20060206

TECHNOLOGY FOCUS - ELECTRICAL POWER AND ENERGY - Preferred Component: The electrochemical device further comprises a microporous separator, particularly polyolefin-based separator.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: The inorganic particles are inorganic particles having a dielectric constant of greater than or equal to 5; or inorganic particles having lithium ion conductivity. The inorganic particles having a dielectric constant of greater than or equal to 5 are barium titanate, lead (zirconate, titanate) (PZT), $\text{Pb}_{1-x}\text{La}_x\text{Zr}_{1-y}\text{Ti}_y\text{O}_3$ (PLZT), $\text{Pb}(\text{Mg}_{3/5}\text{Nb}_{2/5})\text{O}_3$ - PbTiO_3 (PMN-PT), hafnia (HfO_2), strontium titanate (SrTiO_3), tin oxide, cerium oxide, magnesium oxide, nickel oxide, calcium oxide, zinc oxide, zirconium oxide, yttrium oxide, aluminum oxide and/or titanium oxide. The inorganic particles having lithium ion conductivity are lithium phosphate (Li_3PO_4), lithium titanium phosphate ($\text{Li}_x\text{Ti}_y(\text{PO}_4)_3$ ($x=0-2$, $y=0-3$), lithium aluminum titanium phosphate ($\text{Li}_x\text{Al}_y\text{Ti}_z(\text{PO}_4)_3$ ($x=0-2$, $y=0-1$, $z=0-3$), (LiAlTiP) $x\text{O}_y$ type glass ($x=0-4$, $y=0-13$), lithium lanthanum titanate ($\text{Li}_x\text{La}_y\text{TiO}_3$ ($x=0-2$, $y=0-3$), lithium germanium thiophosphate ($\text{Li}_x\text{Ge}_y\text{PzSw}$ ($x=0-4$, $y=0-1$, $z=0-1$, $w=0-5$), lithium nitrides (Li_xNy) ($x=0-4$, $y=0-2$), SiS_2 type glass ($\text{Li}_x\text{Si}_y\text{Sz}$) ($x=0-3$, $y=0-2$, $z=0-4$) and P_2S_5 type glass (Li_xPySz) ($x=0-3$, $y=0-3$, $z=0-7$). Preferred Parameter: The inorganic particles have a size of 0.001-10 microns. The organic/inorganic composite porous film has a pore size of 0.01-10 microns. The film has a porosity of 5-95%, and a thickness of 1-100 microns. Preferred Composition: The inorganic particles are present in the mixture of inorganic particles with the binder polymer at 50-99 wt.% based on 100 wt.% of the mixture.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Component: The inorganic particles are inorganic particles having a dielectric constant of greater than or equal to 5; or inorganic particles having lithium ion conductivity. The inorganic particles having a dielectric constant of greater than or

equal to 5 are barium titanate, lead (zirconate, titanate) (PZT), $\text{Pb}_{1-x}\text{La}_x\text{Zr}_{1-y}\text{Ti}_y\text{O}_3$ (PLZT), $\text{Pb}(\text{Mg}_{3/5}\text{Nb}_{2/5})\text{O}_3$ - PbTiO_3 (PMN-PT), hafnia (HfO_2), strontium titanate (SrTiO_3), tin oxide, cerium oxide, magnesium oxide, nickel oxide, calcium oxide, zinc oxide, zirconium oxide, yttrium oxide, aluminum oxide and/or titanium oxide. The inorganic particles having lithium ion conductivity are lithium phosphate (Li_3PO_4), lithium titanium phosphate ($\text{Li}_x\text{Ti}_y(\text{PO}_4)_3$ ($x=0-2$, $y=0-3$), lithium aluminum titanium phosphate ($\text{Li}_x\text{Al}_y\text{Ti}_z(\text{PO}_4)_3$ ($x=0-2$, $y=0-1$, $z=0-3$), (LiAlTiP) $x\text{O}_y$ type glass ($x=0-4$, $y=0-13$), lithium lanthanum titanate ($\text{Li}_x\text{La}_y\text{TiO}_3$ ($x=0-2$, $y=0-3$), lithium germanium thiophosphate ($\text{Li}_x\text{Ge}_y\text{P}_z\text{S}_w$ ($x=0-4$, $y=0-1$, $z=0-1$, $w=0-5$), lithium nitrides (Li_xN_y) ($x=0-4$, $y=0-2$), SiS_2 type glass ($\text{Li}_x\text{Si}_y\text{S}_z$) ($x=0-3$, $y=0-2$, $z=0-4$) and P_2S_5 type glass (Li_xPyS_z) ($x=0-3$, $y=0-3$, $z=0-7$). Preferred Parameter: The inorganic particles have a size of 0.001-10 microns. The organic/inorganic composite porous film has a pore size of 0.01-10 microns. The film has a porosity of 5-95%, and a thickness of 1-100 microns. Preferred Composition: The inorganic particles are present in the mixture of inorganic particles with the binder polymer at 50-99 wt.% based on 100 wt.% of the mixture.

TECHNOLOGY FOCUS - POLYMERS - Preferred Parameter: The binder polymer has a glass transition temperature (T_g) of -200 to 200degreesC, and a solubility parameter of 15-45 MPa^{1/2}. The porous substrate having pores shows a m.pt. of greater than or equal to 200degreesC. The porous substrate has a pore size of 0.01-50 microns. Preferred Material: The binder polymer is polyvinylidene fluoride-co-hexafluoropropylene, polyvinylidene fluoride-co-trichloroethylene, polymethylmethacrylate, polyacrylonitrile, polyvinylpyrrolidone, polyvinyl acetate, polyethylene-co-vinyl acetate, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethylpullulan, cyanoethyl polyvinylalcohol, cyanoethylcellulose, cyanoethylsucrose, pullulan, carboxymethyl cellulose, acrylonitrile-styrene-butadiene copolymer or **polyimide**. The porous substrate is polyethylene terephthalate, polybutylene terephthalate, polyester, polyacetal, polyamide, polycarbonate, **polyimide**, polyetherether ketone, polyether sulfone, polyphenylene oxide, polyphenylene sulfide and/or polyethylene naphthalene.

FS CPI EPI GMPI
FA AB; GI
MC CPI: A11-B05D; A12-E06; A12-E09; L03-E01A; L03-H05
EPI: X16-B01F1; X16-F02

L41 ANSWER 2 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2005-068525 [08] WPIX

DNN N2005-059092 DNC C2005-024126

TI Polymeric **electrolyte** film for fuel cell, secondary battery, has **porous base** material of preset **glass** transition point, filled with phenol resin having sulfonic acid group or its salt.

DC A28 A85 L03 V01 X12 X16

PA (UBEI) UBE IND LTD

CYC 1

PI JP 2004363028 A 20041224 (200508)* 11 H01B001-06

ADT JP 2004363028 A JP 2003-162092 20030606

PRAI JP 2003-162092 20030606

IC ICM H01B001-06

ICS C08J009-36; H01B013-00; H01M008-02

AB JP2004363028 A UPAB: 20050202

NOVELTY - The polymeric **electrolyte** film has **porous base** material which has **glass** transition temperature above 100 deg. C, filled with phenol resin having sulfonic acid group or

its salt.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for manufacture of polymeric **electrolyte** film. A solution obtained by mixing phenol and/or its derivative(s), sulfite and/or hydrogen sulfite, formaldehyde aqueous solution containing formaldehyde compound and/or methylol and paraformaldehyde, and water, was packed in a porous base material and cured.

USE - As ion exchange membrane and separation membrane for fuel cell, secondary battery and capacitors.

ADVANTAGE - A polymeric **electrolyte** film with excellent heat resistance, is manufactured with sufficient reproducibility. The polyelectrolyte is filled efficiently in the porous base material.

Dwg.0/0

TECH JP 2004363028 AUPTX: 20050202

TECHNOLOGY FOCUS - POLYMERS - Preferred Resin: The phenol resin which has sulfonic acid group or its salt, has structure of formula (1).

R1 = H or 1-6C alkyl; and

X = H or alkali metal.

Preferred Base Material: The porous base material is hydrocarbon group polymer having an aromatic ring, preferably aromatic **polyimide** or aromatic polyether.

Preferred Method: The viscosity of prepolymer solution of phenol resin which has sulfonic acid group or its solution, is 200 poises or less.

ABEX JP 2004363028 AUPTX: 20050202

EXAMPLE - Phenol (in g) (5), para formaldehyde (4.85), sodium sulfite (1), sodium hydrogen sulfite (0.75) and water (5) were heated and stirred for 5 minutes at 85 degrees C under nitrogen stream. A homogeneous solution of pale yellow color was obtained which was cooled to room temperature. The solution had viscosity of 45 centipoise. A polyimide porous base material of glass transition point 275 degrees C, average pore size 0.18 mum, porosity 40%, and film thickness 29 mum, was produced. The base material was immersed in prepolymer solution for 10 seconds at room temperature and filled with the solution. The base material was then interposed in glass plate and heated at 90 degrees C for 15 hours. The sample was removed after cooling from the glass plate and phenol resin was cured. The thickness of film was 30 mum after vacuum drying at 40 degrees C for 16 hours. The film factor was 85 volume%. The film was washed. The obtained film had favorable ion exchange capacity and had ionic conductivity of 1 mmS/cm.

FS CPI EPI

FA AB; GI

MC CPI: A05-C03; A12-E06B; L03-E04A2

EPI: V01-B01B1; X12-D01C; X16-B01F; X16-C01C; X16-F02; X16-J01A; X16-J08

L41 ANSWER 3 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-825237 [82] WPIX

DNN N2004-651827 DNC C2004-287377

TI Fuel cell, for electronic device, has anode, cathode containing III-V group compound semiconductor doped with p-type impurity, and **electrolyte** between cathode and anode.

DC A85 L03 T01 U12 W01 X16

PA (NITE) NIPPON TELEGRAPH & TELEPHONE CORP

CYC 1

PI JP 2004319250 A 20041111 (200482)* 15 H01M004-86 <--

ADT JP 2004319250 A JP 2003-111389 20030416

PRAI JP 2003-111389 20030416

IC ICM H01M004-86

AB JP2004319250 A UPAB: 20041223

NOVELTY - The fuel cell has a cathode (1) contacting fuel gas (4), an anode (3) contacting oxygen gas (5), and an **electrolyte** (2)

provided between the cathode and anode. The cathode contains III-V group compound semiconductor doped with p-type impurity as cathode component.

USE - Electric power generation system for electronic device, e.g. personal digital assistant, cellular phone or notebook sized personal computer.

ADVANTAGE - The fuel cell is compact, inexpensive, eco-friendly, and has high efficiency and durability. The fuel cell provides electronic device with high reliability.

DESCRIPTION OF DRAWING(S) - The figure shows the fuel cell. (Drawing includes non-English language text).

Cathode 1

Electrolyte 2

Anode 3

Fuel gas 4

Oxygen gas 5

Dwg.1/3

TECH JP 2004319250 AUPTX: 20041223

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: III-V group compound semiconductor doped with p-type impurity is indium-gallium arsenide, gallium arsenide or aluminum-gallium arsenide doped with carbon, formed on gallium arsenide substrate, aluminum-gallium arsenide substrate or indium phosphide substrate, or gallium nitride, aluminum-gallium nitride or indium-gallium nitride doped with magnesium, formed on sapphire substrate, silicon carbide substrate, indium phosphide **substrate** or **porous ceramic substrate**, **porous polytetrafluoroethylene** as **porous** heat resistant organic macromolecular material. The anode is III-V group compound semiconductor doped with p-type impurity. The fuel gas is hydrogen gas, mixed gas containing methane, ethane or propane and water vapor, or mixed gas containing methanol vapor and water vapor.

FS CPI EPI

FA AB; GI

MC CPI: A12-E06B; L03-E04B

EPI: T01-L01; T01-M06A1; U12-E01A1; W01-C01D3C; W01-C01E5B; X16-E06A

L41 ANSWER 4 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-432715 [41] WPIX

DNN N2004-342013 DNC C2004-162203

TI Flexible membrane for fuel cells, e.g. for cars or domestic systems, comprises a porous composite support filled with polymer **electrolyte**, a **porous substrate** of **glass** or polymer fibres, and a **porous** ceramic coating.

DC A18 A23 A26 A85 L03 X16

IN HENNIGE, V; HOERPEL, G; HYING, C

PA (CREA-N) CREA VIS GES TECHNOLOGIE & INNOVATION MBH

CYC 1

PI DE 10254732 A1 20040603 (200441)* 20 H01M008-02 <--

ADT DE 10254732 A1 DE 2002-10254732 20021123

PRAI DE 2002-10254732 20021123

IC ICM **H01M008-02**

AB DE 10254732 A UPAB: 20040629

NOVELTY - Fuel cell membrane which is impermeable to the reaction components comprises a flexible, permeable composite support in which the pores are 75% filled with a **proton-conducting** polymer **electrolyte**, a flexible porous two-dimensional substrate made of woven and/or non-woven glass or polymer fibres, and a porous ceramic coating.

DETAILED DESCRIPTION - Dimensionally-stable, **proton-conducting**, flexible membrane (FM) for fuel cells which is impermeable to the reaction components in fuel cell reactions, comprising

a flexible, permeable composite support, a flexible substrate with a large number of openings and a coating in this substrate. The substrate material consists of woven and/or non-woven glass or polymer fibres, the coating is a porous ceramic coating and the pores in the support are filled to at least 75% with a **proton-conducting polymer electrolyte**.

INDEPENDENT CLAIMS are also included for

(a) a method (M1) for the production of FM by infiltrating **electrolyte(s)** or polymer **electrolyte(s)** or precursors thereof into the pores of the support as above

(b) a flexible membrane-electrode unit (MEU) for fuel cells, with conductive anode and cathode layers on either side of FM

(c) a method (M2) for the production of MEU by making FM as above, preparing a material for the production of electrode layers (**proton-conductive** component, catalyst (or precursor) for the anode or cathode reaction, optionally a catalyst support and optionally a pore-former), coating this material onto each side of the membrane (FM) and producing a strong bond between the coatings and the membrane, with the formation of a porous, **proton-conducting** anode or cathode layer

(d) fuel cells containing FM or MEU

(e) mobile or stationary systems with an MEU, fuel cell or fuel cell stack containing FM or MEU as above.

USE - In fuel cells, direct-methanol fuel cells and reformat fuel cells, or for the production of membrane-electrode units, fuel cells or fuel cell stacks (claimed); also claimed is the use of membrane-electrode units containing these **electrolyte** membranes in the applications listed above. Applications include mobile and stationary fuel cells for cars and domestic energy systems.

ADVANTAGE - A dimensionally-stable, **proton-conducting**, flexible membrane which shows almost no change in volume after **swelling** or drying (in spite of the necessary **swelling**), combined with good conductivity and good long-term stability (especially because of the reduced risk of washing out the **electrolyte**). This system combines the advantages of polymer **electrolytes** (water-resistance, long-term stability, high conductivity) with those of flexible ceramic membranes (dimensional stability, high porosity, flexibility).

Dwg.0/0

TECH DE 10254732 A1 UPTX: 20040629

TECHNOLOGY FOCUS - POLYMERS - Preferred Membrane: FM with a thickness of 10-150 microns, a bending radius of down to 5000 m (preferably down to 2 mm) and a conductivity (in the swollen state) of at least 5 (preferably at least 50) mS/cm, stable up to a temperature of at least 80degreesC.

Preferred Units: Membrane-electrode units which can be operated at a temperature of at least 80 (preferably at least 120) degreesC and will tolerate a bending radius as above. **Proton-conducting** material of the same composition is used in the anode and cathode layers and the **electrolyte** membrane. Different catalysts are used in the anode and cathode layers, and the catalyst support in these layers is electrically conductive. Preferred Components: Polymer **electrolytes** (PE) comprise Nafion (RTM), sulfonated or phosphonated, fluorinated or unfluorinated polyolefins, polyethers, polystyrenes, polysulfones, polyphenylsulfones, **polyimides**, polyoxazoles, polytriazoles, polybenzimidazoles, polyether-ether-ketones or polyether-ketones. Preferred supports comprise woven fabric with a mesh width of 5-500 microns or non-woven with a thickness of 5-100 microns, consisting of fibres with a thickness of 0.5-150 microns, preferably aluminosilicate glass fibres with at least 60 wt% SiO2 and at least 10 wt% Al2O3. The substrate consists of non-woven fabric based on polymer fibres, preferably polyacrylonitrile, polyamide, PVDF, **PTFE**, polyolefin

and/or polyimide fibres. Preferred Methods: M1 involves infiltrating the pores of the support with molten PE and solidifying the melt, or infiltrating with a 2.5-50 vol% solution of PE and drying the solution at up to 250degreesC, or infiltrating with precursors of ion-conducting polymers and then polymerising/crosslinking these in the pores. Suitable solvents for PE solutions comprise alcohols, hydrocarbons, ethers, esters, ketones, aldehydes and/or water. Infiltration/drying may be repeated several times, and infiltration may be carried out (possibly as a continuous process) by printing, pressing on or in, roller-coating, spreading, painting, dip-coating, spraying or pouring onto the support. M2 involves (A) pressing the electrode layer materials onto the membrane and forming a strong bond by heating at 20-300 (preferably 80-150) degreesC, or (B) coating the electrode material onto a supporting membrane (preferably of PTFE), drying the coating, pressing the coating onto the membrane at 20-300 (preferably 80-150) degreesC and removing the supporting membrane (preferably by mechanical or chemical methods or by pyrolysis), or (C) using a method similar to (B) with carbon paper or electrically-conductive woven or non-woven fabric as the supporting membrane (which is not removed). The electrode-producing material contains a metal salt catalyst, preferably hexachloroplatinic acid, which is reduced on the membrane to form the required catalyst; an open-pore gas diffusion electrode, preferably open-pore carbon paper, is then pressed onto the catalyst or fixed on the catalyst with a conductive adhesive. Electrode material may be applied repeatedly, optionally with a drying step (preferably at up to 300degreesC) between each application, preferably in a continuous manner onto the membrane (FM) or a flexible supporting membrane taken from a roll of material.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Porous Coating: Particles of aluminum, silicon, zirconium and/or titanium oxide(s).

TECHNOLOGY FOCUS - ELECTRICAL POWER AND ENERGY - Preferred Applications: Systems containing these units and fuel cells comprise vehicles (mobile units) and domestic energy systems (stationary).

ABEX DE 10254732 A1 UPTX: 20040629

EXAMPLE - A mixture of 130 g water and 30 g ethanol was treated with 30 g 5 wt% aqueous nitric acid, 10 g tetraethoxysilane, 2.5 g methyltriethoxysilane and 7.5 g Dynasilan AMEO (RTM: 3-aminopropyltriethoxysilane), then the sol obtained was stirred for a few hours, treated with 145 g MZS1 (RTM) and 145 g MZS3 (RTM), homogenised for at least 48 hours in a closed vessel and filtered to form a fine slurry. Commercial polyacrylonitrile non-woven (thickness 15 microns) was coated with the slurry by a continuous roller process at 280degreesC with a belt speed of 24 m/h, to give a composite support (S450PAN) with a average pore size of 450 nm and a thickness of 30 microns. This support was infiltrated with a 7.5 wt% commercial solution of Nafion (RTM) and dried for 15 minutes at 100degreesC to render the Nafion (RTM) insoluble in water; this process was repeated 6 times to give a moist gas-tight membrane with a BP of more than 6 bar, a Gurley number of more than 1500, a longitudinal expansion of less than 1% in all directions after swelling in water at room temperature and a conductivity of 35 mS/cm (swollen membrane; thickness = 40 microns). A membrane-electrode unit for a fuel cell was made by screen-printing the membrane on both sides with ink containing carbon black, catalyst, Nafion (RTM) and an alcohol mixture, and then drying each coating at 120degreesC to form anode and cathode layers. Fuel cells containing these units were very reliable in operation, showing very good long-term stability and little adverse effect on performance after drying out and re-wetting.

FS CPI EPI
FA AB

MC CPI: A12-E06B; L03-E04G
EPI: X16-C01C; X16-F02

L41 ANSWER 5 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-110585 [12] WPIX

DNN N2004-088065 DNC C2004-045056

TI Proton-conducting, flexible **electrolyte** membrane for mobile or stationary fuel cell, e.g. direct methanol or reformat fuel cell in vehicle or domestic energy system, has perforated glass support, infiltrated with proton-conducting gel.

DC A85 E11 J01 L03 X16 X21

IN HENNIGE, V; HORPEL, G; HYING, C; HOERPEL, G

PA (CREA-N) CREA VIS GES TECHNOLOGIE & INNOVATION MBH

CYC 102

PI DE 10205850 A1 20030821 (200412)* 24 H01M008-02

WO 2003069711 A2 20030821 (200412) GE H01M008-10

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS

LU MC MW MZ NL OA PT SD SE SI SK SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK

DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR

KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT

RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA

ZM ZW

AU 2003244862 A1 20030904 (200428) H01M008-10

ADT DE 10205850 A1 DE 2002-10205850 20020213; WO 2003069711 A2 WO 2003-EP162 20030110; AU 2003244862 A1 AU 2003-244862 20030110

FDT AU 2003244862 A1 Based on WO 2003069711

PRAI DE 2002-10205850 20020213

IC ICM H01M008-02; H01M008-10

ICS B01D069-02

AB DE 10205850 A UPAB: 20040218

NOVELTY - Proton-conducting, flexible **electrolyte** membrane for a fuel cell, which is impermeable for reaction components of a fuel cell reaction, has a flexible, perforated glass support, infiltrated with a proton-conducting gel suitable for selective conduction of protons through the membrane.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) production of **electrolyte** membrane by infiltration of a flexible, perforated glass support with a mixture containing an immobilizable hydroxysilylalkyl-acid (I) of sulfur (S) or phosphorus (P) or its salt or a mixture containing a Bronsted acid and/or (I) or its salt and a sol precursor for aluminum (Al), silicon (Si), titanium (Ti), zirconium (Zr) and/or P oxide, followed by gelation;

(2) **electrolyte** membrane in this way;

(3) flexible membrane electrode array for a fuel cell, comprising the membrane and, on opposite sides, porous, electroconductive anode and cathode films comprising a catalyst for the anode and cathode reaction, a proton-conducting component and optionally a catalyst support;

(4) production of this array by coating each side of the **electrolyte** membrane, simultaneously or consecutively, with a mixture of a condensable precursor for the proton-conducting electrode layer, a catalyst (precursor) for the anode or cathode reaction and optionally a catalyst support and/or pore former and producing a firm bond between these layers;

(5) composition comprising a condensable component (II), which imparts proton conductivity after condensation of an anode or cathode layer of a membrane electrode array of a fuel cell, a catalyst (precursor) (III) for the fuel cell anode or cathode reaction, optionally a catalyst support, optionally a pore former and optionally an additive to improve

foaming, viscosity and adhesion.

USE - The **electrolyte** membrane is used for producing a membrane electrode array or fuel cell (stack); and the membrane and array are used in fuel cells, especially direct methanol or reformat fuel cells (all claimed). Fuel cells with the membrane or array and mobile or stationary systems, especially a vehicle or domestic energy system, with the fuel cell (stack) are claimed per se.

ADVANTAGE - Existing membrane electrode arrays for fuel cells use organic polymers as proton-exchanging membrane but their conductivity depends on maintaining a suitable water content, which cannot be guaranteed at temperatures above 100 deg. C and is generally impossible in reformat or direct methanol fuel cells. Existing inorganic proton conductors cannot be made into the thin membrane films with low surface resistance and high power density needed in lightweight cells.

Electrolyte membranes of ceramic material on a metal support are unsuitable, as they tend to delaminate, whilst infiltration with sol usually leaves too much unfilled volume. The present membranes avoid these drawbacks. Their proton conductivity is higher than that of polymer membranes at low atmospheric humidity and of composites based on porous ceramics. The membrane electrode array has low total resistance and suitable mechanical properties, e.g. tensile strength and flexibility, for use under extreme conditions, e.g. in a vehicle, tolerates operating temperatures above 80 deg. C, avoids short-circuit and cross-over problems and can be produced easily.

DESCRIPTION OF DRAWING(S) - The drawings are schematic sections of **electrolyte** membranes, comparing a commercial membrane with glass filaments surrounded by ceramic particles with a membrane in which ceramic particles are randomly distributed in an **electrolyte** gel.

Glass filaments G

Ceramic particles K

Electrolyte gel E

1a, 1b/2

TECH DE 10205850 A1 UPTX: 20040218

TECHNOLOGY FOCUS - CERAMICS AND GLASS - Preferred Support: The glass is an aluminosilicate glass containing not less than 60 wt.% SiO₂ and not less than 10 wt.% Al₂O₃; preferably 64-66 wt.% SiO₂, 24-25 wt.% Al₂O₃, 9-12 wt.% magnesium oxide (MgO) and less than 0.2 wt.% calcium, sodium, potassium and/or ferric oxide(s) (CaO, Na₂O, K₂O, Fe₂O₃).

It preferably is in the form of glass fibers or filaments with an acid-resistant coating of alpha-Al₂O₃, ZrO₂ or TiO₂ on glass with the composition 52-56 wt.% SiO₂, 12-16 wt.% Al₂O₃, 5-10 wt.% boron oxide (B₂O₃), 16-25 wt.% MgO, less than 2 wt.% Na₂O + K₂O, less than 1.5 wt.% TiO₂ and less than 1 wt.% Fe₂O₃.

The support comprises glass fibers and/or filaments with a diameter of 1-150 (preferably 1-20) mum, yarn with a diameter of 5-150 (10-70) mum, woven fabric with a mesh size of 5-500 (10-200) mum or nonwoven. It is 10-150 (10-50) mum thick.

TECHNOLOGY FOCUS - ELECTRICAL POWER AND ENERGY - Preferred Membrane: The **electrolyte** membrane comprises a proton-conducting gel of immobilized acid (I) and optionally an Al, Si, Ti, Zr and/or P oxide (IV) and/or a Bronsted acid (V) and (IV) as network former. Preferred (V) are sulfuric, phosphoric, perchloric, nitric, hydrochloric, sulfurous and phosphorous acid and their esters and/or monomeric or polymeric organic acids.

The volume ratio of gel to support is at least 30 to 70. The gel contains particles of ceramic oxide(s) selected from Al₂O₃, SiO₂, ZrO₂ and TiO₂, preferably in particle size fraction(s) in the 10-100 nm, 100-1000 nm and/or 1-5 mum size range.

The membrane is stable up to at least 80 (120) degrees C and tolerates a bending radius down to preferably 10 (5) mm.

At room temperature and at most 40% relative humidity, its conductivity is not less than 5 (not less than 50) mS/cm. The membrane may have a proton-conducting coating that is insoluble in water and methanol on one or preferably both sides.

Preferred Process: The sol is obtained by hydrolysis of a hydrolyzable compound, preferably in a mixture of water and alcohol, and peptization. Infiltration is carried out under pressure, by immersion or by rolling, spreading, spraying or casting the mixture on the support. Infiltration may be carried out repeatedly, optionally with drying (preferably at 50-200 degrees C) between stages, especially in a continuous process.

The **electrolyte** membrane is consolidated by heating to 50-300 (80-150) degrees C, preferably with warm or hot air, infrared radiation or microwave radiation. To make the membrane electrode array, the anode and cathode coatings and membrane are bonded by pressing and heating to 50-300 (70-150) degrees C.

The coating composition is applied to a temporary (**PTFE**) or permanent (carbon paper or electroconductive (non)woven fabric) support, dried and pressed onto the membrane at 20-300 (80-150) degrees C. The temporary support is removed, preferably mechanically, by chemical dissolution or by pyrolysis. These coating compositions contain a catalyst metal salt, preferably hexachloroplatinic acid, which is reduced to a catalyst after application. An open-pored gas diffusion electrode (carbon paper) may be pressed onto the catalyst or bonded to it with an electroconductive adhesive. The coatings may be applied (continuously) to a (preheated) flexible **electrolyte** or support membrane taken from a roll.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Components: The gel contains proton-conducting substances selected from Ti and Zr phosphate and phosphonates, iso- and hetero-polyacids, preferably phosphotungstic acid or silicotungstic acid, or nanocrystalline metal oxides, preferably Al₂O₃, ZrO₂, TiO₂ or SiO₂ powder.

Preferred Coating: Preferred water- and methanol-insoluble outer coatings for the membrane include r and Ti phosphates, phosphonates and sulfoarylphosphonates and mixtures of organic and inorganic proton conductors.

Preferred Composition: Suitable condensable components (II) include a hydrolyzable P compound, a hydrolyzable metal(loid) (oxy)nitrate, (oxy)chloride, carbonate, alcoholate, acetate or acetylacetonate, preferably Al or vanadium (V) alcoholate, Ti propylate or ethylate, Zr (oxy)nitrate, propylate, acetate or acetylacetonate; metal acids of Al, Ti, V, antimony (Sb), tin (Sn), lead (Pb), chromium (Cr), tungsten (W), molybdenum (Mo) and manganese (Mn), especially phosphotungstic acid; and compounds (I). The catalyst (precursor) (III) is platinum (Pt), palladium (Pd) and/or ruthenium (Ru).

Preferred other components are (in)organic compounds decomposing at 50-300 (100-200) degrees C, especially ammonium (bi)carbonate, as pore formers; and carbon black, graphite, carbon, activated charcoal or metal oxides as electroconductive catalyst support.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Components: Acid (I) is an organosilicon compound of formulae (IA) or (IB);

$((R)O)Y(R_2)Z)ASi(R_1-SO_3-)AXMx+$ (IA);

$((R)Y(R_2)Z)ASi(R_1-Ob-P(OcR_3)O_2-)AXMx+$ (IB);

R₁ = linear or branched 1-12 C alkyl or alkylene, 5-8 C cycloalkyl,

-(CH₂)_n-Cyc-(CH₂)_m- or -(CH₂)_n-Phe-(CH₂)_m;

Cyc = cyclohexylene;

Phe = phenylene;

n, m = 0-6;

M = H, NH₄ or a metal;

x = 1-4;

y, a = 1-3,
 z = 0-2;
 y+z = 4-a;
 b, c = 0 or 1;
 R, R2 = (m)ethyl, propyl, butyl or H;
 R3 = M, (m)ethyl, propyl or butyl
 Preferred (I) are trihydroxysilylpropylsulfonic acid,
 trihydroxysilylpropylmethylphosphonic acid and dihydroxysilylpropyl-
 sulfonic di-acid. (I) is immobilized with a hydrolyzed P compound, a
 hydrolyzed metal(loid) (oxy)nitrate, (oxy)chloride, carbonate, alcoholate,
 acetate or acetylacetonate, a hydrolyzed compound obtained from diethyl
 phosphite, diethyl ethylphosphonate, Ti propylate, Ti ethylate, tetraethyl
 orthosilicate or tetramethyl orthosilicate, Zr (oxy)nitrate, Zr propylate,
 Zr acetate, Zr acetylacetonate, methyl phosphate or with precipitated
 silica.

TECHNOLOGY FOCUS - POLYMERS - Preferred Coating: Preferred water- and
 methanol-insoluble outer coatings for the membrane include Nafion (RTM:
 ion exchange resin), sulfonated or phosphonated polyphenylsulfone,
 polyimide, polyoxazole, polytriazole, polybenzimidazole,
 polyether-ether-ketone (PEEK) and polyether-ketone (PEK)

ABEX DE 10205850 A1 UPTX: 20040218

EXAMPLE - 120 g Levasil 200 (RTM: 20 % solution of precipitated silica)
 was mixed with 10 g diethyl phosphite, 10 g ethanol and 10 g sulfuric
 acid. After 1 hour, 5 weight% Aerosil 200 (RTM: fumed silica) was added and
 the suspension was homogenized for 30 minutes. After 24 hour, 40 weight%
 alumina (Al₂O₃; RTM: CT3000) were added. In a continuous process, the
 suspension was rolled onto 70 mum thick S-glass fabric and the membrane
 was dried with hot air at 120degreesC for a few minutes, giving
 proton-conducting membrane (A). The conductivity was 5 mS/cm at about 25%
 relative humidity (RH) and 81 mS/cm at over 80 % RH. A solution of 10 ml
 Dynasil A (RTM: tetraethoxysilane) in 10 ml ethanol was added to 10 ml 5 %
 solution of Nafion (RTM: ionexchange resin) with vigorous stirring, and
 stirring was continued for a short time. Both sides of (A) were roll
 coated continuously with this solution and dried at 100 degrees C, giving
 proton-conducting membrane (B). To make electrodes, a ceramic nonwoven was
 coated with a carbon black/platinum mixture (40%). These electrodes were
 pressed onto a (A) and (B) with a graphite gas distributor plate, which
 also provided electrical contact. Pure hydrogen was supplied on the anode
 side and pure oxygen on the cathode side. Both gases were humidified
 through a bubbler. This cell could be operated even at about 10 % RH on
 the anode side and 5% RH on the cathode side without substantially
 impairing its function. In a similar cell with a proton-conducting
 membrane of Nafion 117 (RTM: ionexchange resin), the proton conductivity
 of this membrane fell drastically at under 100 % RH and the surface
 resistance increased strongly, so that the fuel cell could no longer be
 operated.

FS CPI EPI

FA AB; GI; DCN

MC CPI: A11-B05; A12-E06A; A12-E06B; E05-E; E05-G; E05-L; E05-L01; E05-M;
 E05-N; E31-P02D; E31-P03; E31-Q08; E33; E34; E34-C02; E35; E35-K02;
 E35-L; J01-C03; L03-E04A2

EPI: X16-C01C; X16-J01A; X16-J09; X21-A01F; X21-B01A

L41 ANSWER 6 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2003-266455 [26] WPIX

DNN N2003-211658 DNC C2003-069589

TI Membrane battery vent for electrochemical cells, comprises battery case,
 perforation(s) in battery case, hydrogen gas selective permeable membrane
 integral, and porous substrate.

DC A85 L03 X16
 IN BRADFORD, Z R; DEJOHN, M D; HOCKADAY, R G; NAVAS, C J; TURNER, P S;
 UHRICH, F W; VAZ, H L; VAZUL, L L
 PA (BRAD-I) BRADFORD Z R; (DEJO-I) DEJOHN M D; (HOCK-I) HOCKADAY R G;
 (NAVA-I) NAVAS C J; (TURN-I) TURNER P S; (UHRI-I) UHRICH F W; (VAZH-I) VAZ
 H L; (VAZU-I) VAZUL L L; (ENER-N) ENERGY RELATED DEVICES INC
 CYC 1
 PI US 2002182482 A1 20021205 (200326)* 11 H01M002-12 <--
 US 6953637 B2 20051011 (200567) H01M008-00 <--
 ADT US 2002182482 A1 US 2001-870777 20010601; US 6953637 B2 US 2001-870777
 20010601
 PRAI US 2001-870777 20010601
 IC ICM H01M002-12; H01M008-00
 AB US2002182482 A UPAB: 20030428

NOVELTY - A membrane battery vent comprises a battery case; at least one perforation in the battery case; a hydrogen gas selective permeable membrane integral; and a porous substrate adjacent the perforation in the battery case for venting batteries.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a gas vent for batteries comprising a sealed battery container, a perforation in the sealed battery container, a gas selective permeable catalytically active membrane vent and gas recombination mechanism for batteries, integral with a porous substrate and covering the perforation in the sealed battery container and a perimeter seal extending at least partially around the membrane, and sealing at least a peripheral portion of the membrane vent to the battery container around the perforation.

USE - For electrochemical cells.

ADVANTAGE - The inventive membrane battery vent allows evolved hydrogen gas to vent out of the battery without letting other gases, i.e. carbon dioxide or air into the battery and water vapor in or out.

DESCRIPTION OF DRAWING(S) - The figure shows a cross-sectional view of the etched nuclear particle tracked membrane with the selectively permeable coatings and permeable outer protective coatings.

Gas permeable coating 2

Dwg.2/7

TECH US 2002182482 A1UPTX: 20030428

TECHNOLOGY FOCUS - ELECTRICAL POWER AND ENERGY - Preferred Function: The membrane passes hydrogen gas preferentially over other gases (i.e., water, carbon dioxide and oxygen).

Preferred Component: The membrane further comprises:

- (a) a catalytic layer and a dispersive layer, or a catalytic surface on both sides of the membrane that acts as a gas recombination mechanism of gases evolved from within the battery case;
- (b) **electrolytes** in contact with selective permeable films for electrochemical catalysis of hydrogen or oxygen or catalytic promotion of hydrogen oxygen recombination;
- (c) a diffusion layer for limiting recombination to a surface of catalysts or rate of recombination;
- (d) a non-selective gas permeable coating and hydrogen selectively permeable coating coated over a non-selective gas permeable coating (2);
- (e) diffusion gas mats placed on the membrane;
- (f) a seal for sealing the membrane of the battery case and for diffusing gas through the perforation in the battery case; and
- (g) a pressure relief valve or burst foil.

The membrane is formed by:

- (a) coating and plugging pores of a porous substrate with selectively permeable materials;
- (b) coating a porous substrate with selectively hydrogen permeable materials; or
- (c) coating a porous substrate with vacuum deposited selectively permeable

materials.

Preferred Substrate: The substrate comprises porous semiconductors.

TECHNOLOGY FOCUS - CERAMICS AND GLASS - Preferred

Substrate: The substrate can also comprise

porous plastics, porous glasses or porous ceramics.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: The catalytic surface comprises catalysts metals (a) from the transition metal elements comprising platinum, palladium, nickel, copper, silver, chromium, molybdenum, tungsten, cobalt, iron, ruthenium, titanium, zirconium, vanadium, niobium and/or tantalum; or (b) alloyed with elements i.e., carbon, silicon and tin for acting as a gas recombination mechanism of the gases hydrogen and oxygen evolved from within the battery case.

Preferred Substrate: The substrate can also comprise porous metals.

Preferred Material: The hydrogen permeable materials comprise transition metals or transition metal compounds or alloys. The vacuum deposited selectively permeable materials comprise platinum, palladium and its alloys, palladium/silver alloy, palladium/copper alloy, titanium/nickel alloy, AB2 (e.g., zirconium manganate) or AB5 (e.g., lanthanum nickelite) coatings, lanthanum, titanium, zirconium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, iron, ruthenium or cobalt.

TECHNOLOGY FOCUS - POLYMERS - Preferred Component: The membrane further comprises a gas permeable coating of silicone rubber, polyvinyl chloride, polyethylene, fluorosilicone, nitrile silicone, natural rubber, polytetrafluoroethylene, polymer electrolytes or perfluorosulfonic acid.

Preferred Substrate: The substrate can also comprise etched nuclear particle track dielectric films of polycarbonate plastic, polyester, polyimide, polypropylene, porous polyethylene, or porous polyethersulfone.

FS CPI EPI
FA AB; GI
MC CPI: A12-E06; L03-E01D1
EPI: X16-F03B

L41 ANSWER 7 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2002-531434 [57] WPIX

DNN N2002-420837 DNC C2002-150785

TI **Electrolyte** film manufacture for fuel cell involves forming preset polymers having proton conductivity.

DC A85 L03 X16

PA (KAGA-N) KAGAKU GIJUTSU SHINKO JIGYODAN; (NAKA-I) NAKAO S; (YAMA-I) YAMAGUCHI T

CYC 1

PI JP 2002083612 A 20020322 (200257)* 11 H01M008-02

ADT JP 2002083612 A JP 2000-272203 20000907

PRAI JP 2000-272203 20000907

IC ICM H01M008-02

ICS C08J009-40; H01M008-10

ICI C08L027:18, C08L079:08

AB JP2002083612 A UPAB: 20020906

NOVELTY - The method involves forming polymers (I,II) which are prepared by different processes. The film has a porous base material (1) whose pore (2) inner surface has a swelling-resistant property in an organic solvent and water. The polymers (I,II) have proton conductivity.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

- (1) **Electrolyte** film;
- (2) Fuel cell; and

(3) Manufacture of fuel cell

USE - For fuel cell (claimed) such as methanol direct type solid polymeric fuel cell.

ADVANTAGE - The **electrolyte** film inhibits permeation of methanol. The **electrolyte** film has excellent heat resistance.

DESCRIPTION OF DRAWING(S) - The figure shows the model diagram of the porous base material.

Porous base material 1

Pore 2

Dwg.1/5

TECH JP 2002083612 AUPTX: 20020906

TECHNOLOGY FOCUS - **INORGANIC CHEMISTRY** - Preferred **Base**

Material: The **porous** base material consists of an inorganic material or a heat resistant polymer. The inorganic material is ceramic, glass, alumina or their composite material.

TECHNOLOGY FOCUS - **POLYMERS** - Preferred Polymer: The heat resistant polymer is **polytetrafluoroethylene** or **polyimide**.

FS CPI EPI

FA AB; GI

MC CPI: A12-E06; L03-E04A2

EPI: X16-C01; X16-C01C

L41 ANSWER 8 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 1987-270881 [38] WPIX

DNC C1987-115026

TI Stabilising electroconductive poly pyrrole or poly aniline polymer - by encapsulation in epoxy, **polyimide** or bis-maleimide resin.

DC A21 A25 A26 A32 A95 L03

IN NEWMAN, P R; WARREN, L F; WITUCKI, E F

PA (ROCW) ROCKWELL INT CORP

CYC 1

PI US 4692225 A 19870908 (198738)* 9

ADT US 4692225 A US 1986-883253 19860708

PRAI US 1986-883253 19860708

IC C25B003-00

AB US 4692225 A UPAB: 19930922

An electroconductive polypyrrole or polyaniline polymer is stabilised by encapsulation in an epoxy, **polyimide** or bis-maleimide resin.

Pref. the conductive polymer may be prepared electrochemically or chemically and may be a powder, a free-standing film or a substrate impregnated with the polymer. A curable epoxy, **polyimide** or bis-maleimide resin may be applied to the conductive polymer and cured, especially using an epoxy resin and curing at high temperature A **porous substrate** especially of **ceramic**, **glass**, organic foam or (non)woven fabric (partic. a fibre glass fabric (pref.), a mixed oxide fabric, or a synthetic organic fibre) is impregnated with the conductive polymer, forming a conductive composite, followed by application of the curable resin and curing; partic., the conductive polymer is polypyrrole and the curable resin is an epoxy. A fabric may be impregnated with polypyrrole by contacting the fabric, especially fibre glass, with an anode in an **electrolytic** cell containing an **electrolyte** comprising a pyrrole monomer and a non-nucleophilic anion, electrochemically depositing a conductive pyrrole polymer in the pores of the fabric, and removing the impregnated fabric.

USE/ADVANTAGE - The conductive resins are stable in hostile media e.g. 250 deg.F in air, 100% O2 at room temperature or 90% RH at 160 deg.F. The shelf life is prolonged. The encapsulated conductive materials have application as conductive composite structural materials, semiconductor components and electrical conductors, and in antistatic applications and

electromagnetic interference shielding.

0/3

FS CPI

FA AB

MC CPI: A05-J; A05-J11; A09-A03; A11-B05; A12-E04; L03-A02D; L03-G; L04-A04

L41 ANSWER 9 OF 9 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 1982-05812E [03] WPIX

TI Organic reinforced metal oxide fibre composite - with discontinuous sintered fluoro plastic coating, useful as alkaline cell separator.

DC A85 L03 X16

IN VERZWYVELT, S A

PA (HUGA) HUGHES AIRCRAFT CO

CYC 1

PI US 4308325 A 19811229 (198203)* 5

PRAI US 1980-135608 19800331; US 1981-316242 19811029

IC H01M002-16

AB US 4308325 A UPAB: 19930915

A mechanically strong, thermally stable inorganic-organic composite, wettable in and chemically resistant to aqueous alkaline solns. comprises (a) an **inorganic substrate** formed from porous fragile metal oxide fibres, chemically inert w.r.t. aqueous alkaline solution, pref. having irregular surfaces; physically reinforced with (b) a discontinuous coating of sintered crystalline high mol. weight fluoroplastic particles that have been absorbed on the substrate surface.

A structural material for use in making separators for alkaline storage cells, where evolved gases recombine to form elevated temps. in the presence of aqueous alkaline **electrolyte**, comprises a composite as above, using a woven fabric substrate having interstices permitting gas flow. The fluoroplastic is pref. **PTFE**; fluorinated ethylene propylene; chlorotrifluoroethylene; polyvinylidene fluoride; or polyvinyl fluoride.

Composites are gas permeable, strong and lightweight, and are especially useful in spacecraft power systems, providing long life in normally sealed cells operating in **electrolyte** starved conditions.

FS CPI EPI

FA AB

MC CPI: A04-E10; A12-B08; A12-E06; L03-E01A

EPI: X16-F02

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